REPORT UUX

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PIMP MY HEINZ

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In this report it is explained in detail the design process of the user experience of an interactive web service for making extremely customized sauces, fictionally offered by Heinz and hosted in an ancillary website of the company's major website. The service is conceived for a young Italian adults' target with specific habits and desires. The focus of the customization is on the overall recipe, type and quality of the ingredients and quality of the package; further actions are also allowed.

The service aims at bridging the gap between the taste assurance and prestige that a brand sauce offers and the growing need for making individual choices according to personal priorities and tastes. The user segmentation and user research, contexts of use and task analysis, together with the expert review and user testing performed on a similar service, gave progressively shape to a human and user-centred design, following her needs both as users and as customers.

1. Ethnographic analysis

> *"Sì, certo certo, però tu ascoltami bene adesso, Boris, noi dobbiamo fare una grandissima regia, io ti voglio concentrato, come l'anno scorso, capito? Dobbiamo spaccare tutto Boris! Dai, dai, dai!"*
>
> (René) [a Boris]

Ethnographic analysis is a scientific field study that focuses on social sciences' topics (such as cultural systems and how people relate with these systems) from a *holistic* point of view. It examines all the parts of the whole, including processes, meanings and relations between each element co-existing within the examined system.

Ethnography is relevant to usability testing and user-centered design because it provides access into the real-life environment of the end-user from a social, technological and personal point of view. It allows to develop a greater understanding on how people interact with existing technology, how they feel while doing that and how they would react while interacting with a different kind of tool or service. Finally, it allows to better determine how a product could best meet the users' needs, what to do and what to avoid in order to satisfy their expectations. In other words, ethnographic analysis provides *context*.

1.1 Segmentation of target audience

Audience segmentation is the process of dividing a large population into smaller groups of people - or segments - who have similar needs, values or characteristics. The segments can be based on *demographics* (geographic location, age, occupation, etc…) and / or *psychographics* (personality, values, attitudes, etc…).

Audience segmentation can be an extremely useful first step towards a more comprehensive audience research because it makes the design more *focused* by defining target audiences,

meeting their needs and earning their loyalty. Thanks to segmentation and the processes it introduces, the level of product customization this project aims to reach becomes possible.

First of all, it is necessary to define the general characteristics of the population and decide what criteria are to be used to segment it, based on certain significative differences with regards to demographic, psychological and behavioral traits among members of that population. The strategy used to segment the audience depends on the product or service that is being delivered.

As a starting point in our segmentation analysis we looked for how Heinz company targets its users. Heinz is a worldwide company which aims its products to both individuals (i.e. families), other companies and festivals. Furthermore, it has caught the attention of children and teens with imaginative new colours, new 'bottoms-up' easy-colours, new 'bottoms-up' easy-squeeze bottles and organic squeeze bottles and organic varieties. Undoubtedly Heinz is a brand icon with a heritage familiar to consumers across the world. Heinz will always offer superior product quality and will be portrayed as a genuine, 'heart in the right place' brand. Heinz stands apart in the way it comes across to consumers and always radiates originality, purity and quality.

Taking this statements as a starting point for our research, our work is just an enlargement of this interest in quality product and eco policy.

What came out from this context, in the case of *Extreme Customization* of food processing and delivery, it might not make sense to treat people with different gender identities as separate segments, because gender does not represent an influential factor with respect to the purchase and consumption of food. However, it might be practical to segment them according to their eating behavior and level of engagement. People who have been interested in food preparation, sustainability and quality of ingredients and know the products that are being sold will probably engage with the business differently than people who are just not that interested in these topics.

In particular, the following set of characteristics has been used for the segmentation of the target audience:

- age
- occupation
- passions & hobbies
- lifestyle
- preferences
- level of engagement
- eating habits
- buying habits
- expression of self

Although the point of segmentation is to aim for specificity, it is possible to overdo it. What actually matters the most is to have a smaller, relevant market with defined needs and characteristics and that is sizable enough to be worth targeting.

With this in mind, a major audience segment has been identified. Considering that there is a lack of a fidelized market in Italy (mostly due to a different way to conceive, understand and practice food preparation and consumption), an *Extreme Customization* method might be an alternative method to functionally approach an untapped market and an unbroached audience of potential consumers.

TARGET USERS - Target users would be young Italian people who are status-oriented and like to make unique experiences and let other people witness them. The target user has a medium-high level of technical expertise, knows how to use a computing device in most of its aspects and how to exploit many of its functionalities. They might be interested and even passionate about food, but due to their lifestyle they probably would not have time to prepare their own food systematically, so at times they buy pre-packed fresh ready meals. They prefer high quality products and with an eye to organic ingredients. They hold creativity and uniqueness in high regard and do not like obvious, basic things. Since they are moderately wealthy, they do not care that much about how much they spend on a product, as long as its price is justified by its uniqueness. This segment contains:

- those people who care about social events and like to surround themselves with other like-minded people;
- those people who are more self-focused, particularly driven by status and are social media *aficionados*;
- those people who are interested in environmental issues, the conscious use of materials and the quality of food with respect to wellness and sustainability. They represent a kind of ecologist that is more focused on their own image.

1.2 User research

User Research helps place people at the center of the design process and products. It is used to create designs that are pleasurable and easy to use and relevant to the user segment identified in the previous section *Segmentation of Target Audience*. Conducting research on people in the contexts where they will use the design is commonly done at the very beginning of a project and then gets integrated as a part of the work process so that the product gets tested iteratively and from an early stage of development onward.

Usually, *User Research* is conducted by using both quantitative and qualitative methods. In order to have a well-rounded and complete view on the chosen segment, both types of methods have been used, and specifically:

- interviews, an example of qualitative research tool, which allows to get an in-depth understanding of the experiences of everyday lives of individual users and user groups;

- a survey, an example of quantitative research tool, which allows to measure user behavior in a way that can be quantified and used for computation, statistical analysis and data visualization.

INTERVIEW - Behaviors, needs and characteristics of the segmented audience have been tested, recorded and summarized through an interview, built on an ad-hoc questionnaire that has been structured as follows:

1. *Introduction*: explanation of what the project is about; the interviewee states their name, age, occupation. Even if this information can be acquired through the interview itself, it can be useful as an introduction to the more specific sections of the interview, in order to start chatting with the interviewee and let them acclimatize. The next question are about hobbies and lifestyle
2. *Buying habits*. How do they choose the products to buy? For example: price, materials, ingredients, etc…
3. *Information about the product*. Before going to the store / visiting the store site, do they look for any information regarding the product they might be interested in?
4. *Source of information*. Where do they look for information regarding the product? For example: Instagram, aggregator sites, friends, online reviews, etc…
5. *Frequency*. How frequently do they look for information regarding the products they want to buy? Let them explain clearly how they make a decision in peculiar cases, for example when buying an expensive product.
6. *Packaging*. Do they care about the peculiarity of how the product has been packaged? I.e., a package made by quality material and with an aesthetically-pleasing design, accompanied by a handwritten card, etc…
7. *Type of product*. Do they look for new products or do they prefer to buy products they are loyal to?
8. *Positive choice factors*. Which factors positively shape the decision-making process of the customer? I.e.: price, ingredients and quality, materials, sustainability, etc…
9. *Negative choice factors*. Which factors negatively condition the decision-making process of the customer in a negative way? I.e.: price, uncertainty about ingredients' and materials' quality, etc…
10. *Online purchasing*. Do they like to buy online? What about buying food online? I.e.: if they wish to buy ketchup, what would boost their confidence in the product and service? What would puzzle them?

A series of useful information was inferred from the answers given by the interviewees. One of them, a 24 years old med student, used to work in food service. She said that her biggest passions are "eating food, preparing food for myself and other people… well, food in general!" and art, thus it is reasonable to expect she would pay special attention to ingredients, quality, taste and appearance. With respect to her buying habits, she revealed a complexity in her decision-making process, for which she actually takes into consideration several factors while deciding whether she should buy something or not. First of all, she takes into account the *quality-price ratio*, in order to optimize the purchase. Then she evaluates how much money she is willing to spend on that product, especially if she likes it but does not need it that much. While operating this evaluation, she also considers a series of qualitative and quantitative

factors such as the raw materials, craftsmanship, etc… Finally, what has a definite bearing on the whole process of decision-making is whether there is a sudden, impulsive and uncontrollable longing to buy that specific product or not. She looks for information about the product, wants to know everything about it by examining carefully the product label but also by surfing on the Internet. Interestingly enough, she does not care about other people's opinions: she looks for facts, not opinions, and those facts help her to get to know aspects of the product that are not immediately inferable. She does not care that much about the package, but she loves when a product is instilled with a distinctive nature, character, temperament or personality ("*indole*"). She tends to buy what she already knows about, although she is not afraid of experimenting. She is also open to spend more for what she really wants, given a series of important factors such as a"no-miss offer", the quality-price ratio, the awareness towards ethics and sustainability, etc… On the other hand, she is not interested in products that are characterized by redundancy, superfluity and excessive refining. An overly elaborate packaging proves to be disturbing as well. Mostly she cares about the *quality* factor, which includes knowing what ingredients and / or materials are used ("sapere cosa ci sia dentro"). She likes buying food online, especially if it is something that she cannot easily find in physical stores. She looks for the craftsmanship in the product, and likes to think about the product as if it was made specifically for her and not for the masses.

The second interviewee is a 26 years old student who likes traveling, cinema, nature and surfing. She is a dynamic type of person who does not like repetitiveness. She pays attention to product and packaging quality, notably related to materials and waste-reduction. She also looks for a balance between a fair price (neither too low nor too high) and adequate quality. She looks for information about the product by trying to verify its quality from multiple points of view, for example by comparing it with other similar products. She likes to experiment and discover new products by speaking about it with fellow peers. She also exploits Youtube channels, forums, specialized blogs and, with less frequency, social media. She does not look for information about commodities; she chooses some products impulsively, others with informed criteria, mostly according to product *price and longevity*. She likes the process of running an in-depth, extensive search. Knowing about the origin of the product and the materials that make it up is fundamental, especially for those bound to localities that pride themselves of being specialized in the production of specific products or materials from a cultural, historical and traditional point of view. It is what inspires trust, expertise and, ultimately, quality. The label and the package should communicate the provenance of the product in a clear and coherent way, curated with special care if possible (for example, a handwritten thank-you note accompanied with a related product sample). She likes to try out new products; what she looks for in a product is a middle ground between product characteristics she prioritizes, quality, and a curated design that respects and reflects what the product is about. What throws her off is a cheap, kitsch design that does not adjust to the nature and scope of the product. She does not mind buying products online, since sometimes it is convenient, but she does not do that often. With regards to food, she hardly ever buy it online. A major factor that instills trust is detailed information about how the product comes into existence in order to prove the truthfulness and consistency of what the product narrates through its design. The idea of a chronological narrative that describes the whole process of production, from the collection of raw material to the shipping of the complete product, entices her. In particular, she would greatly appreciate to know more about the delivery

system, the conditions the product undergoes and the assurance of quality also from that perspective.

The third interviewee is a 23 years old student whose passions are producing music, reading, traveling, cooking and eating. He describes himself as a person who is “dynamic due to the variety of activities he conducts, and sedentary due to how he conducts them”. He engages in physical activities such as jogging and cycling that are conducted in an irregular, discontinuous way. He cares for the *price* of the products and gives attention to the benefit degree related to that product: if it is characterized by a relatively long shelf-life, he tends to buy it in larger quantities, provided that it is economically convenient. He pays attention to sustainability, especially if it refers to how the packaging is made: in general, he favours fresh food over plastic-wrapped stuff and second-hand products over brand new ones. Overall, he looks for durability. He is reflective and tends to avoid any impulsive purchase. He looks for information about the product by examining its label and listening to and reading about other consumers’ experiences. He is easily influenced by his peers’ opinions he considers to be reliable. If two products are equivalent in terms of quality and one of them costs more due to pretentious branding, he will certainly choose the other one. He feels more adventurous while choosing essential goods, otherwise he bases his choice on the investment it entails and on the opinion of other trustworthy people. According to his reasoning, the more a product implies a cautious investment in terms of money and longevity, the more he tends to investigate on its quality. The materials might have its own importance: he favours *eco-friendly and biodegradable materials*. A form of customization of the product packaging has a partial relevance, more related to special occasions (such as a new products; instead, the more the product is durable and is chosen for the long-term, the more he tends to stick to a familiar product he is already faithful to. He prefers natural products, with a sustainable packaging and a generally acceptable ratio between quality, quantity and durability. Provenance can be relevant if it is related to raw materials: knowing that a fresh product has been made away from where the purchase is being made disheartens him. If the product belongs to a multinational brand, he wants to informs himself about the *environmental impact, exploitation, endorsement and other factors related to societal issues*. He also dislikes a low-quality graphical presentation / design (for example: incoherent or not functional, excessively simple or complex, more aesthetically-focused rather than practical, etc…). To him, an excessive packaging feels like a symptom of a minor quantity with respect to the actual product. He tends to buy online products that are not immediately available nearby. Factors that leave him uncertain with respect to online services consist of shipping costs and excessive packaging derived from shipping itself. It also depends on a lot of other factors, such as quality, provenance, quantity… Knowing that the product packaging is being managed with care towards sustainability inspires trust. He also likes to cut down shipping costs by buying larger quantities of the product. In general, sauces are not a product that he would buy: he would rather prepare them by himself.

SURVEY - A more atomic knowledge about the targeted audience has been obtained through an online survey that has been structured as follows:

1. How old are you?
2. What is your profession?

3. What kind of work do you do?
4. Have you ever used a web application to customize a product or service?
5. If so, which one?
6. Which features did you like?
7. Did you buy the product?
8. Would you like to be able to customize your own Heinz sauce?
9. Would you customize your Heinz sauce for a specific / special occasion?.
10. Which aspect of the sauce would you like to be able to customize?
11. How much extra would you be willing to pay for an exclusive, customized product?
12. Which aspect of the customization of a sauce would satisfy you the most?

Thanks to the survey it has been possible to trace a more accurate profile of the target audience. Take into consideration the following graphs:

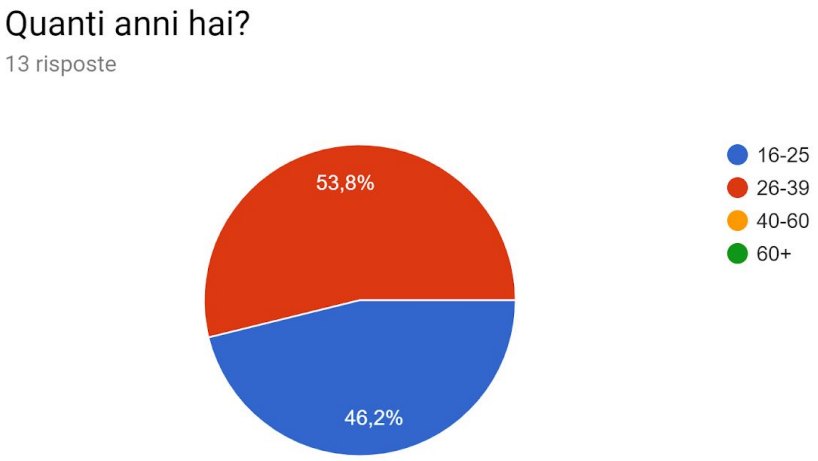

Figure 1. *Results on target audience age groups.*

Information related to age fits pretty well with what was expected: the target audience's age tends to line up within a young age group, whose members range from being 16 to 39 years old, with a slight imbalance towards the 26-39 years old subgroup.

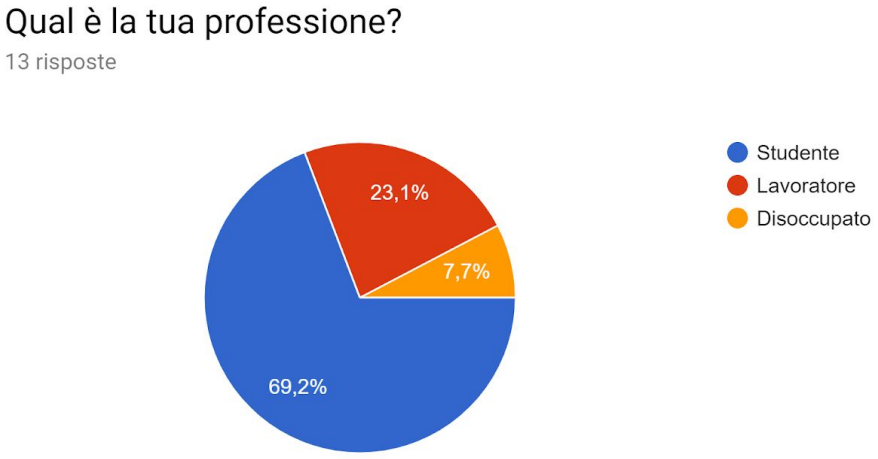

Figure 2. *Results on target audience professions.*

Given the results with respect to age groups as seen in Figure 1, it is reasonable to notice that a vast majority of the target audience is composed by students. A smaller percentage of them is working. Very few are currently unemployed.

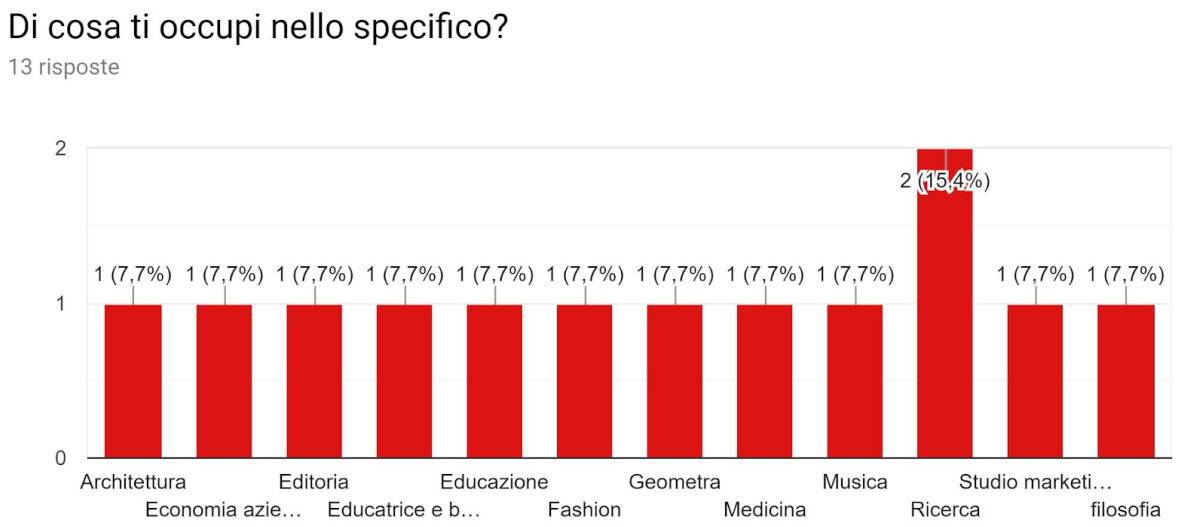

Figure 3. *Results on target audience professions (more detailed).*

No sensible difference that is particularly interesting emerges from the specification of what is the target user's occupation. As it can be seen in Figure 3, the histogram is flat and does not show particular signs of skewness. It is safe to say that, whatever the field they study or work in, it does not represent a very relevant factor for the research. However, at this point, it is already possible to assess that the target audience consists indeed of young people with dynamic lifestyles, characterized by study and/or work in various fields.

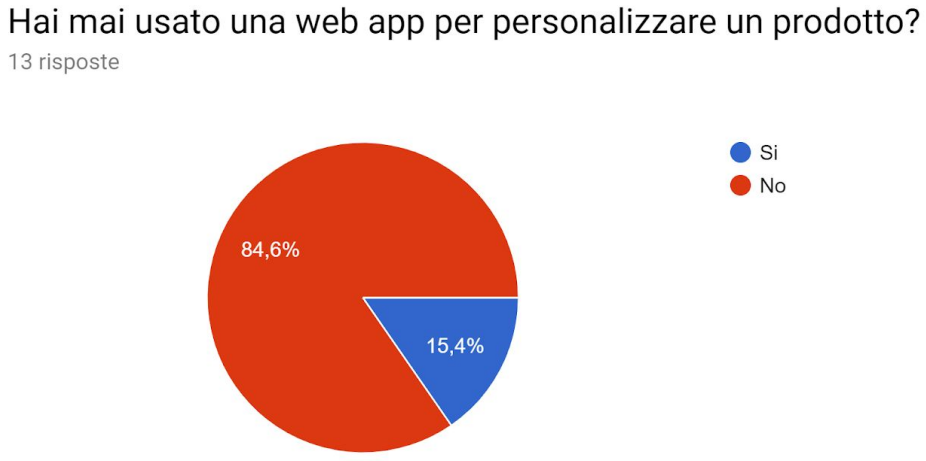

Figure 4. *Results on target audience customization habits.*

An interesting takeaway, as highlighted in Figure 4, is the low percentage of people who already tried some kind of customization service. It is clear that, in the current state of affairs,

customization services are neither well-known nor used that much by Italian people, even among the younger chunk of the population.

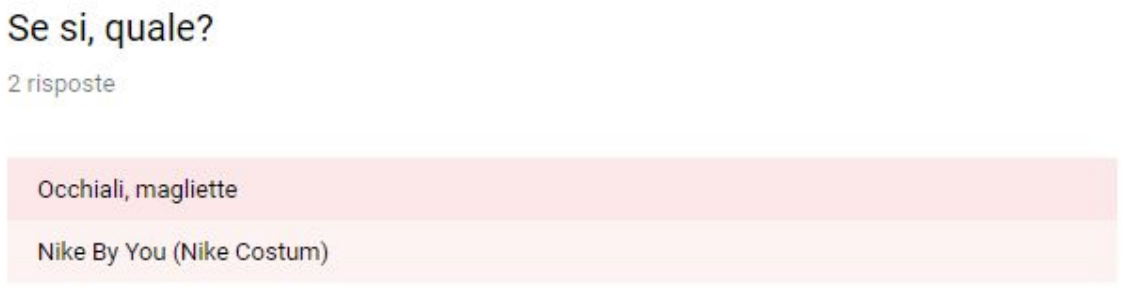

Image 5. *Results on target audience customization habits (more detailed).*

Product customization, a small niche that is steadily growing, has mostly tended to be limited to fashion and clothing, powerful status symbols that naturally appeal to customization practices.

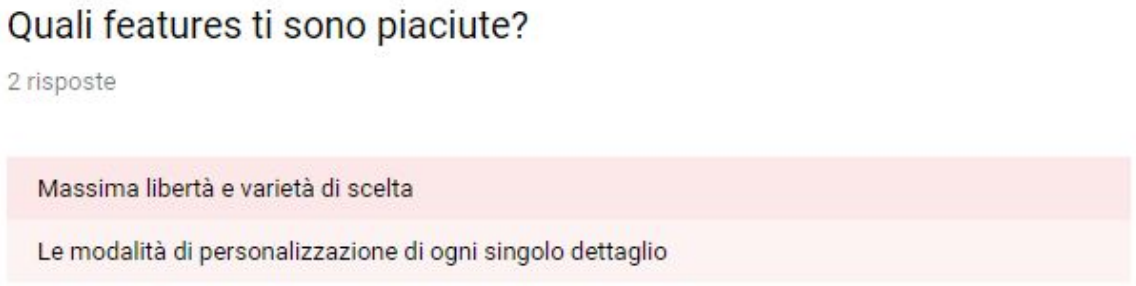

Image 6. *Results on target audience preferences regarding customization features.*

The most appreciated customization features tend towards the freedom of choice and the possibility of acting upon the product or service at the most detailed level, if desired so.

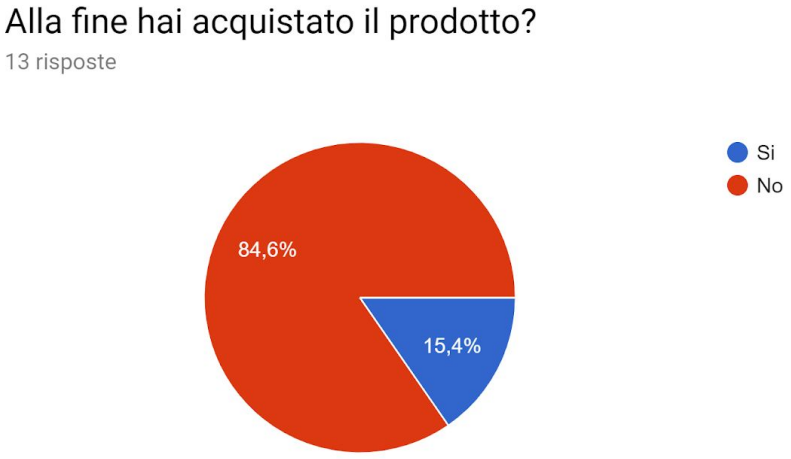

Image 7. *Results on target audience buying habits.*

This is another most interesting point, fundamental to bear in mind for the design, Customization, in its own way, can be experienced as a fun interactive diversion. A user might be drawn to the service and feel curiosity about the process and the final result of the customization, but there is no certainty that they would be willing to *actually buy* that customized product.

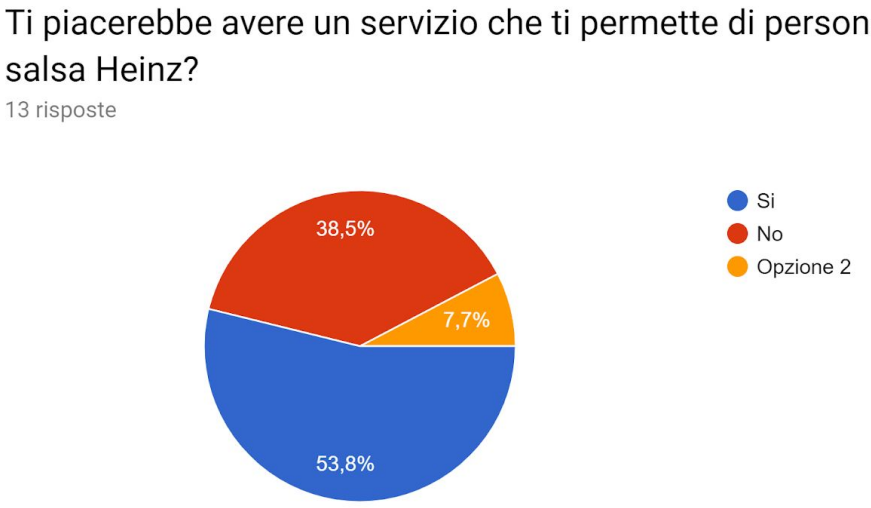

Image 8. *Results on target audience customization preferences.*

In general, there is a small majority (slightly above 50%) of people interested in a service like the one presented in this project. This may seem disheartening but it was actually expected: Italy prides itself with a food culture based on a rich and varied diet in which an important italian tradition related to sauces does exist. Thus, people generally trust food prepared with homegrown ingredients and closer to the reality they are acquainted to, rather than large corporations' brands and large-scale preparation of more bland food, despite the nature of the initiative.

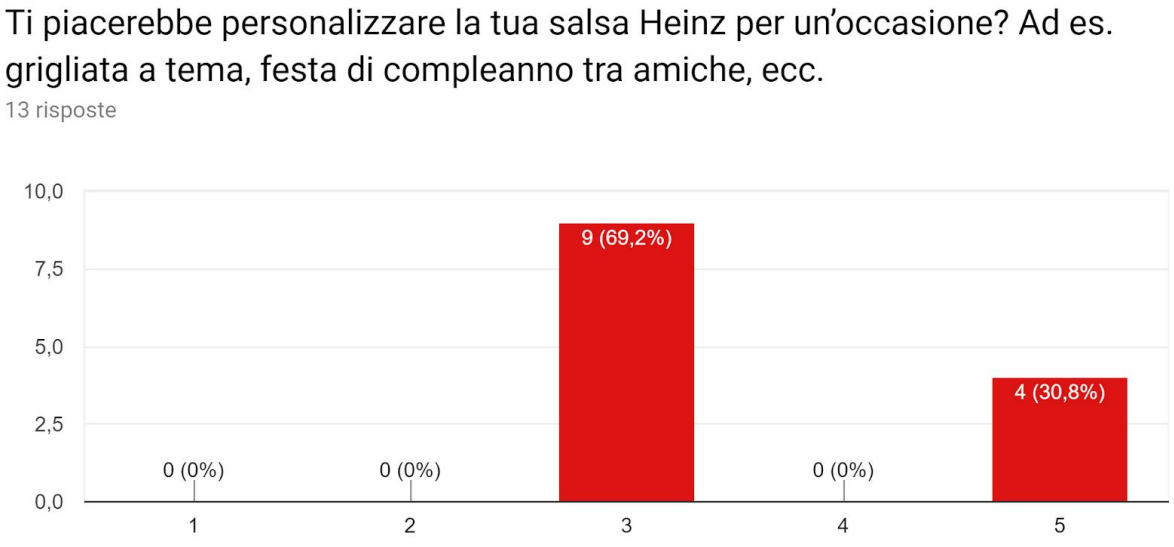

Figure 9. *Results on target audience customization preferences (2).*

This graph tells us that at least the majority of people would not mind too much or too little about customizing a sauce for a special occasion. A minor segment would be enthusiast.

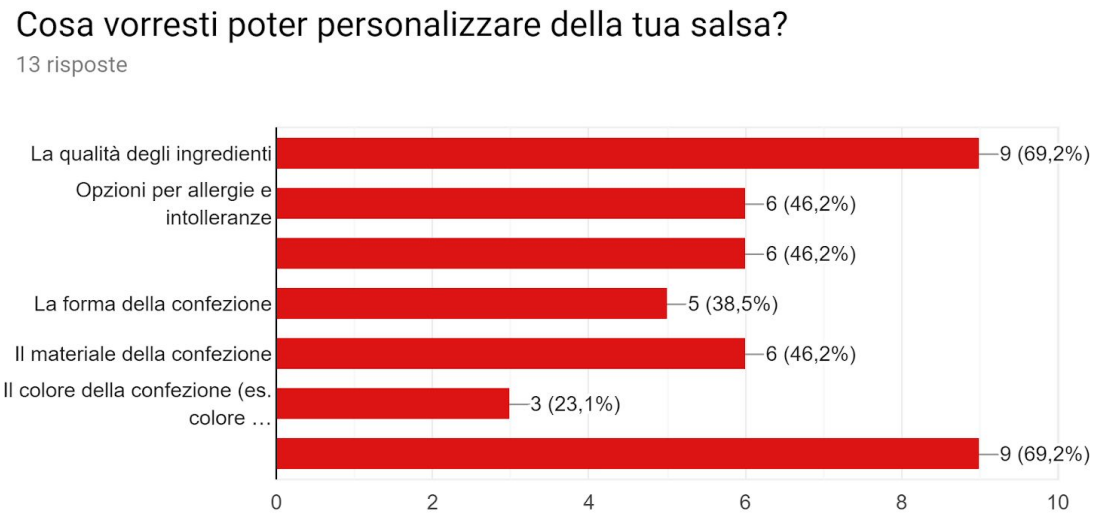

Figure 10. *Results on target audience customization preferences (3).*

This is arguably one of most important graphs and the one most condensed with information. First of all, it is possible to observe how the *quality of the ingredients* and the *design of the label* represent the most stimulating aspects of the product that users want to customize, and that perfectly represent the two sides of the same user segment that has been identified: the food-oriented and the status-oriented. *Options for allergies and intolerances*, *options for vegetarian and vegan diets* and the *material of the package* are the second most important factors and generally also fall back into the environmentalist and food-aware paradigm identified during target audience segmentation. In terms of importance, the least voted factors are, respectively, the *shape of the package* and the *color of the package*. The customization that focuses on the factors that could enhance / influence the user's social status and how it is perceived by peers is a treat, but it is also clear that what matters first and foremost is the quality and attention to the ingredients.

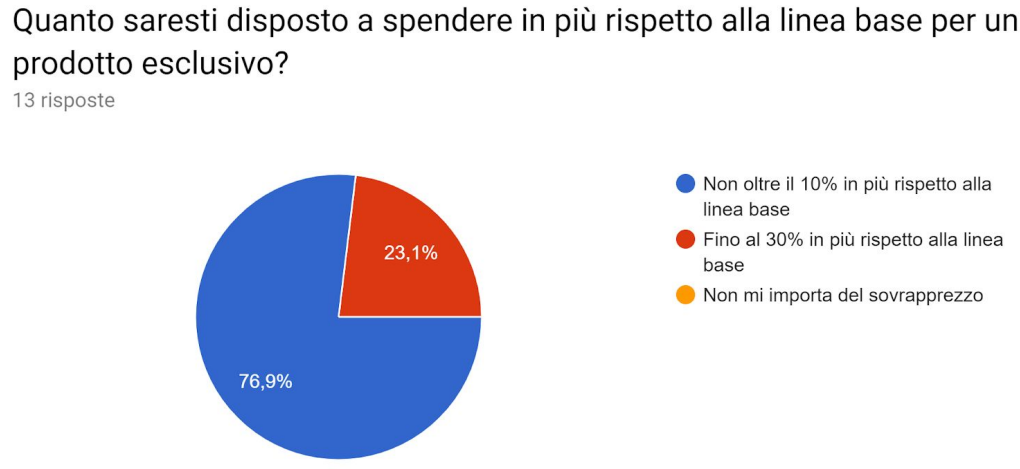

Figure 11. *Results on target audience buying preferences.*

Although there may be interest in the product, users still care about the price enough to have reservations as to whether buy the customized product or not. This is understandable, considering the fact that the majority of them are students that have either never tried a product customization service or, in case they did, probably did not buy the final result of the customization process.

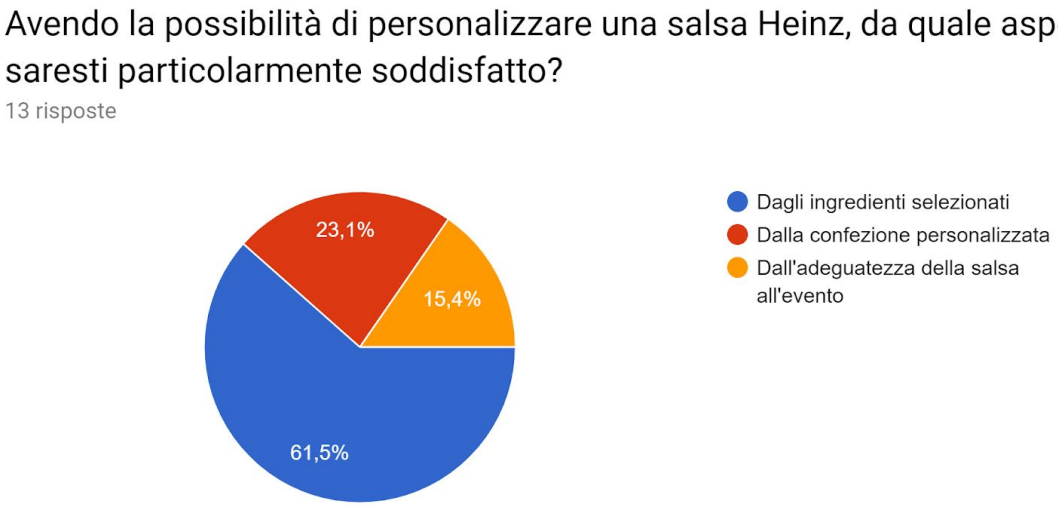

Figure 12. *Results on target audience customization preferences (4).*

Considering the other results and especially those shown in Figure 10, it is possible to notice that the results are coherent with what has been discussed about until now. The careful selection of ingredients is the most important customizable aspect of a sauce and it will be prioritized in the design.

2. Assessment of Existing Resources

> *"Alfredo, allora senti, è molto semplice: basito lui, basita lei, macchina da presa fissa, luce un po' smarmellata e daje tutti che abbiamo fatto!"*
>
> (René)

Evaluating the state and the performance of existing systems is a fundamental step in the process of designing a usable site. Evaluation and analysis are useful to have a more developed farsightedness with respect of systematic errors made by users during the execution of tasks and the behavior with which the users themselves confront the problem at hand and manage to reach their goal.

The guidelines, the services offered by the system at hand, the target users and any kind of obvious problem that can be immediately assessed are presented in the following sections. Direct and reverse analyses are also provided in order to supply the study with more precise information and validate it thoroughly.

Two website have been reviewed and tested:

- the website of the company "Pimp my Heinz" is subsite of, namely "Heinz";
- "CustomHeats", competitor and driving model for the application.

2.1 Expert Usability Review (Heinz)

2.1.1. Choice of guidelines (Heinz)

Userfocus.co.uk guidelines have been adopted for the expert usability testing of "Heinz" website. These guidelines are specific, detailed and functional for the analysis of a content-based showcase website. They are also structured, schematic and convenient for novice web designers.

The guidelines are in total 247, organized in 9 categories, each of which deals with a different topic, such as usability homepage, task orientation, and so on. Each guideline is tested against a given aspect of the site pertaining to its respective category. For each guideline, the site is marked as either conforming ([1]), not conforming ([-1]) or not relevant (the slot is left blank, in the case that guideline does not apply to the site). Note that the category "Forms and data entry" does not apply to the site we are evaluating.

2.1.2 First Inspection of the System (Heinz)

The site that is being analyzed is a showcase website for Heinz products, with additional information about the production of ketchup (its most renowned product) and the history of the venture.

As for the *Services Offered*, there are no particular interactions/functionalities with the system. It only shows features of the firm. Users cannot buy products from the website; they can only look for information about them. The website and its sections are primarily focused on providing information:

- "Home": the main page of the website;
- "Products": the products' catalogue, organised in product lines, containing specific info about products;
- "Grown not made": the brand goals and values in ethical / sustainable production. The focus is on ketchup and its main components, such as tomatoes;
- "Recipes": a catalogue of possible recipes that can be made with the various HEINZ products;
- "Our heritage": a section dedicated to the venture's history.

More specifically, "Home" offers a general view of the website contents. It contains a pleasantly-looking image and a showcase of buttons, each linked to other sections of the website: "Learn how Heinz grows ketchup" sends the user to "Grown not made"; "Learn about our heritage" sends the user to "Our heritage"; the section "Featured products" sends the user to either ketchup, mustard or mayonnaise products, while "See all" sends the user to "Products".

The "Products" section is in turn divided into a number of subsections, each dedicated to the varieties of a specific product (such as Ketchup, Mustard, Mayonnaise, BBQ sauce, Gravy, etc.). In general, products consists of different flavors and / or bottle size of the same sauce. Special care has been provided for the Ketchup subsection, the only one that has been segmented into precise subcategories such as "Classic", "Health & Wellness" and "Flavors".

The "Grown not made" section is consists of a single webpage, dedicated to the description of the raw material used to produce ketchup and the whole production cycle of such product, from the tomatoes' seeds to the bottle. The focus on sustainability and environmental awareness is clear, evident and emphasized multiple times.

Each recipe in the "Recipes" section has its own devoted webpage, which contains an image of the dish, a list of ingredients, a clickable step-by-step guide, some tips about preparation and a nutrition table. The page also highlights recommended dishes that the user may enjoy.

The "Our heritage" section is divided into three subsections: "Overview", "Timeline" and "Past Ads". Once the page is entered, it is possible to notice that it is actually titles "The proud history of Heinz". Following a minimal introduction, there are two links that relate this subsection to the other two. The "Timeline" subsection is actually titled "The complete history of Heinz" and contains a timeline composed of a horizontal ruler, a series of clickable circles, each indicating a decade, and a carousel whose images are directly related to the decade currently selected.

In each page the header and the footer stay the same. The header contains a clickable logo that sends the user back to the "Home" page, the various sections and a search bar. The footer contains the clickable icons of all the social media through which it is possible to come into contact with the firm, the "Terms and Conditions" section, the "Privacy Policy", and a copyright statement.

As for the *Target User*, it belongs to a wide range of possible consumers, since Heinz products are well established and made by a worldwide leader in its sector. Heinz customers may either like a broad variety of different condiments, just a few of them or even one: the most important factor is that targeting is directed towards those people who are interested enough on quality. Other aspects of Heinz targeting scheme that can be observed are a tendency of addressing their product directly to American people and a usage of images evidently aimed at families, since a lot of photos in most of the website sections show a child consuming typical American food seasoned with Heinz products.

With regards to *Immediately definable problems*, it is possible to notice the lack of an actual "Contacts" section (which should be a relevant service to be offered, because it is an informative website and people may need to ask for some kind of additional information). The possibility of getting in contact offered by social media technology may look compelling. It certainly does have its advantages: social media allow a more granular interaction with customers and it opens up for the possibility of using a more active and direct way to approach current and potential clients. On the other hand, the lack of a centralized contact system that allows a better management of users' questions, requests and complaints represents a missed opportunity for growing a more functional and efficient business. Another issue is represented by the poor design of the link "See all" beside the title of the subsection "Featured products" in the "Home" page. It needs more emphasis and visual appeal, because it is not intuitive and the user could get confused or might not realize its intended function.

2.1.3 Direct Analysis: System vs Guidelines (Heinz)

Direct analysis consists of a systematic exploration of an application with respect to guidelines taken as a reference. The evaluation of Heinz website usability is based on the functions made available by the system at issue. It does not take into account the user target and the tasks that can be performed. The carried out analysis is very systematic: the website has been analyzed screen by screen. For each screen, it has been said which guidelines have been violated, how often and with which impact.

The entirety of the Direct Analysis is available in the "Project Management Material" folder as a separate document called Appendix I: Direct Analysis (Heinz), due to its length. The elements that are present in all the screens are reported separately to not repeat the same information for each screen. What follows is a summary table of the Direct Analysis results.

Category	Violated Guidelines	N	Frequency	Impact
Primary Navigation	Navigation and IA	2	1) 33.3%	66.7%

			11) 33.3%	
	Writing and Content	1	16) 33.3%	33.3%
Secondary Navigation	Navigation and IA	1	13) 100%	100%
Footer	Help, Feedback and E. T.	1	5) 100%	100%
Homepage	Homepage	2	1) 50%	100%
			4) 50%	
Page of a single product	Help, Feedback and E. T.	2	6) 50%	100%
			16) 50%	
Recipes page	Help, Feedback and E.T	2	6) 50%	100%
			16) 50%	
Page of a single recipe	Help, Feedback and E.T.	2	6) 20%	40%
			16) 20%	
	Navigation and IA	3	14) 30%	60%
			15) 20%	
			19) 10%	
Overview page	Navigation and IA	3	14) 33.3%	100%
			15) 33.3%	
			19) 33.3%	
Past ads	Help, Feedback and Error Tolerance	2	6) 33.3%	66.7%
			16) 33.3%	
	Navigation and IA	1	19) 33.3%	33.3%
Results of a search	Search	6	5) 16.7%	100%
			6) 16.7%	
			9) 16.7%	
			12) 16.7%	
			19) 16.7%	

			20) 16.7%	

Table 1. *Results of the Direct Analysis.*

2.1.4 Reverse analysis: guidelines vs system (Heinz)

The reverse analysis has been conducted by testing each guideline against the aspect or aspects it refers to and has been given a score which could either be -1 (violated guideline), 0 (more or less compliant guideline), 1 (compliant guideline) or blank (not applicable). The results have been gathered and a score for each guideline category has been computed and summarised in a table:

	Raw score	# Questions	# Answers	Score
Home Page	14	20	19	87%
Task Orientation	18	44	26	85%
Navigation & IA	14	29	22	82%
Forms & Data Entry	0	23	0	
Trust & Credibility	3	13	9	67%
Writing & Content Quality	12	23	18	83%
Page Layout & Visual Design	25	38	33	88%
Search	-1	20	17	47%
Help, Feedback & Error Tolerance	7	37	25	64%
Overall score		247	169	75%

Table 2. *Results of the Reverse Analysis.*

As it can be seen, the site fared well (above 80%) in terms of “Home Page”, “Task Orientation”, “Navigation & IA”, “Writing & Content Quality” and “Page Layout & Visual Design”. The site fared averagely (around 60%) in terms of “Trust & Credibility” and “Help, Feedback & Error Tolerance”. The site fared below average (below 50%) in terms of “Search”. “Forms & Data Entry” is not relevant to the site.

In general, on one hand, it is possible to assert that Heinz website is appealing to look at and to navigate through. It is relatively easy for the user to orient themselves in the web page. Its written content has quality to it; the site also presents itself very well. On the other hand, it is not easy to contact someone for assistance and the site does not contain third-party support to verify the accuracy of information.

More precisely, it is possible to extract the following information from the analysis results. Starting with the home page, it can be observed that it opens with a value proposition that is vivid, effective and well-complemented with a high-quality image. Overall, the home page contains useful content that is presented in a professionally designed, neatly ordered, user-friendly and task-oriented way. The most important products are showcased and supplemented with a link to more related content. The presence of a search input box allows a more focused alternative to scrolling through the whole site.

In any case, navigating through the site is, on the whole, a pleasurable experience. The navigation system is broad and shallow, with a clear visual "starting point" to every page. Each

page on the site shares a consistent layout that is not over-formatted and is devoid of any unnecessary or distracting visual and textual information. The good balance between white space, information density and backgrounds helps users identify discrete functional blocks of items and text. The colours work well together and complicated backgrounds are avoided, so that users are encouraged to explore the site, which requires minimal scrolling, clicking and effort to complete common tasks. The path for any given task is a reasonable length (2-5 clicks).

The relationship between controls and their actions is obvious. The site caters for users with little prior experience of the web and allows them to control the pace and sequence of the interaction. The site structure is simple, with a clear conceptual model and no unnecessary levels. Information is organised hierarchically, from the general to the specific, and the organisation is clear and logical. The major sections of the site are available from every page (persistent navigation) and there are no dead ends. Navigation tabs are located at the top of the page, and look like clickable versions of real-world tabs.

The content is compelling, unique and fresh: it is updated frequently and the site includes recent content. Text is concise and free of typographic errors. Labels and links tend to be clear and descriptive. Fonts are readable and used consistently.

Good visibility in search engines is assured by the effective title and URL. The site is robust and all the key features work (i.e. there are no javascript exceptions, CGI errors or broken links). The site avoids advertisements, especially pop-ups, and users will not confuse the site graphics with banner ads. The site also correctly anticipates and prompts for the user's probable next activity.

2.2 User testing (Heinz)

The testing method that has been chosen to evaluate Heinz site and CustomHeats site is *Discount Usability Testing*, an economical evaluation method based on thinking-aloud tests, scenario prototypes and heuristics. These techniques are part of a design cycle where a prototype is tested and problems are detected and dealt with in an iterative way.

2.2.1 Definition of the testing protocol (Heinz)

In the planning phase, it has been decided to analyze (see previous analyses in sections 2.1.3 and 2.1.4) and test the website we chose as an anchor to engage the interface for the subsite, the one used as an e-commerce platform. The tested website corresponds to the official Heinz website. The tests carried out on real users have allowed us to make credible, realistic and demonstrable considerations on the system, starting from the problems encountered by them. The diagnosis of such problems has been the basis for improving the usability of the system that is being designed.

The first decision that must be made with respect to the *User Testing* is to decide the test type to perform. There are two ways to perform a test: one based on statistics and another on common sense. In our case, it has been decided to adopt a *common sense test*, which

requires a smaller number of users to be tested and a non-specialized team. Specifically, a *Discount Usability Testing* (also known as Guerilla Usability Testing) has been performed. It is an economical evaluation method based on thinking-aloud tests, involvement of few users, scenario prototypes and heuristics and that is informal, intuitive and formative.

In our case, the tests were performed by three different users. The protocol for the test, the *Informal Thinking Aloud*, requires the users who are taking the test to think literally aloud during the test, expressing their thoughts, doubts and reflections related to the steps and decision-making when reaching their goal. Neither psychologist nor laboratories or professional cameras are used. A member of the team (specially prepared) manages the test and the user performing the test. In particular, the test driver reads tasks (planned before running the test) and the user tries to reach the goal specified in the task by browsing the website in question. The testers have been selected depending on their characteristics in a way similar to the characteristics of our target user. Later in the documentation, we will refer to the testers using their alphabetical identifier. The testers are the following:

1. Tester A: a 37-year-old female interior designer. She has been living with her boyfriend in an apartment for about 4 years. She has no children. She loves going to the beach during the weekend, even if it's winter.
2. Tester B: a 24-year-old man, a law student. He is not engaged. He earns some money by doing the promoter for a nightclub.
3. Tester C: a 26-year-old woman, an aspiring dentist engaged to another aspiring dentist. She is able to speak Spanish since she has been studying at University in Spain for four years.

The tasks to be performed by the testers are seven. They are useful for obtaining indications regarding the usability of the system being designed. They have been expressed in Italian since either all the test participants' mother tongue is Italian or they are fluent in it.

The tasks are the following:

Number	Task	Goal
1	Search for the light/healthy ketchup product line.	Verify all the versions of a sauce.
2	You are allergic to soy and fish. Search for the barbecue sauces (BBQ) you can eat safely.	Check for a specific allergy.
3	Search for the Mayochup sauce.	Search for a specific sauce.
4	Search for the countries where Heinz tomato crops are located.	Search for information with ethical implications.
5	You have a Heinz Worcestershire Sauce in the fridge and do not know what you can combine it with. Look for dishes that are suitable for that	Match sauces with food.

	sauce.	
6	You have entered the Heinz website to make purchases. You have decided to buy "Heinz Real Mayonnaise" 15 fl oz (fluid ounce). Buy it.	Test the possibility of buying stuff on the website.
7	Search for information about the complete history of Heinz.	Deal with Heritage section, searching for specific info in it.

Table 3. *User Tasks for testing Heinz websites.*

Task 1 is needed to verify the intuitiveness of the first approach to the search for a product by category (ketchup). In addition, in more detail, it verifies the visibility and correct use by the user of a tab whose function is very similar to that of the filters applied to the search.

Task 2 is necessary to verify the incidence of the lack of filters or other tools that support a more detailed search on user performance.

Task 3 is necessary to verify the intuitiveness, effectiveness and visibility of the labels chosen for each product category and the tools for research (in particular, the search bar in primary navigation).

Task 4 is necessary to verify the searchability of such information and to understand in which section / page of the website the user would have expected to find such information.

Task 5 is necessary to verify the searchability of such information and to understand in which section / page of the site the user would have expected to find such information. Furthermore, it is proposed to verify if the research tools made available are sufficient to search for this information.

Task 6 is necessary to verify whether the structure and design of the website under examination suggests in some way to the user that it is an e-commerce. Furthermore, the movements of the user on the screen and her reasoning in researching the tools to buy a certain product are carefully monitored. We want to understand: which tools does the user expect to find when she is aware that the site she is browsing is an e-commerce site? In which position and form within the website? What are the sections where she most expects to find tools for buying a product? Which are the aspects of the website at issue that most suggest the fact that this is an e-commerce?

Task 7 is necessary to understand if this information is easily and easily searchable, and if the tools and the structure of the website help with the research.

The device on which the tests have been performed are a MacBook Air and an iPhone 7. No tablets have been used since the mobile version of the website is identical to the version for tablets. The browser used has depended on the habits of the users to whom the test was

submitted. Two users have used Google Chrome, the other one Safari. At the beginning of the test, the site had already been opened on a particular browser chosen by the user who was going to perform the test. At the end of each task the user was requested to return to the homepage (Vai alle informazioni che dicono che manca in navbar la sezione home). During the test, the screen of the device was recorded just to guarantee to the members of the team that every step of the execution of the task was taken into consideration, also in case of temporary distraction of the test conductor.

The steps of the test are the following:

- One user at a time is called to a room where there are a desk and three chairs: the one on the right is reserved for the test driver, the one in the center for the user, the one on the left for an assistant who takes notes on the movements of the user on the website to achieve the objective of the proposed task and on the user's thinking aloud.
- The test driver (specially trained) explains to the user at issue the goal and the rules of the test as it is a funny game. The introduction text is the following:

  "The test consists of a series of tasks to be completed by browsing the website that we will show you. The purpose of the test is to test the website in terms of functionality and usability with the aim of verifying whether it can be improved in certain aspects. We will not test your skills, so during the navigation you can feel comfortable. The tasks in total are 7 and for each task we have a time of 3 minutes. In total the test will last 21 minutes. In case you feel like you are not able to to reach the goal and so to complete the task, you can easily tell us it, so we will keep on with the next task. Also in this case you can feel calm: if you will not be able to complete a task, it means that there is a design error in the website: it is absolutely not the fault of the user. I ask you to pretend to be alone during the test and in addition to reflect aloud about the actions you are taking to reach the goal. Once you think you have reached the goal, I ask you to let us know, so we can carry on with the next task. In the case that you have not understood the subject of the task, you can let us know in such a way as to provide you with further clarifications. During the test, furthermore, you can ask questions: they will help us to understand better what the problems are linked to the site. However, we will not be able to answer you or help you in any way. One more thing: during the test, if you give us your consent, we will record the actions you perform on the screen and audio, so we can better understand the problems related to the website."

- After the introduction by the test driver, the assistant asks some personal data about the tester: name, surname, the device and browser usually used for navigating and the experience degree in navigating the website under examination (none, low, medium, high).
- The test driver opens the browser previously indicated by the tester and the website to be tested.
- The test driver reads only one task and observes the execution of the task by the tester together with the assistant.
- The tasks are read and executed until the end of the test.
- At the end of the test, further comments and suggestions are requested to the user.

- Once the tester is gone, the members of the team involved in the test discuss about the detected usability problems.

At the end of each task the users are asked to go back to the homepage. This process is repeated until all the users have performed the test.

2.2.2 Testing (Heinz)

For each tester, the evidence / results following the execution of a task, the comments, the suggestions, the reflections and mental processes expressed during the test are reported. This information will be useful in the design phase for a more accurate study of usability.

1. Tester A: she has been asked to take the test first. She has shown herself to be sure and to have taken this test as a challenging game.

    - Task 1: The user first of all clicks on the "Products" section in the main navigation and in secondary navigation "All products". Since she does not find any information about light / healthy lines of products and no filter that could help in the search, she decides to try the next "Grown not made" section. She is not sure whether the solution to the task can be found in this section or not, but she tries to scroll the page trying to grasp the most relevant information in a rather slow manner at the beginning that becomes more rapid and impatient as she keeps going forward. She realizes that even in this section there is no reference to light / healthy lines of products. So, she returns on her initial steps in a fast and almost angry way. Then, she clicks again on "Products" and in secondary navigation "Specialty Sauces". She checks first from the photos of the products if there is the presence of a ketchup. Almost all the bottles look alike and all have the typical red color of ketchup, so she quickly searches the text information for the words "light" or "healthy". The search is unsuccessful, so she clicks on "Products" again, then "Ketchup" and finally on the page dedicated to ketchup she realizes the subtitle "HEALTH & WELLNESS" of a product line. So, she tells us she is convinced that she has arrived at the solution.

      She has completed the assigned task.

    - Task 2: The user first clicks on the "Products" section in the main navigation and "BBQ Sauce" in the secondary navigation. She explores the various sauces trying to focus her attention on them. As trial, she decides to open the first product to check if there is information about allergies or anyway references to soy and fish. She realizes that part of the textual information, present in the single page dedicated to the single sauce, is dedicated to the ingredients. In fact, this paragraph is called "Ingredients". She buys more security and conviction for having found this paragraph. Then she checks if these ingredients are present in this text, reading every single ingredient. She tells us that she has reached the goal by explaining how to check that a certain

ingredient is present or not in a product. However, she does not notice the presence of a paragraph entitled "Allergens".

She has successfully completed the assigned task.

- Task 3: The user feels confident with this task, reassured by the presence of a search bar in primary navigation. She types the string "Mayochup" and gets three results. She checks which one is the right one by reading the name of each product presented in a confident way and arrives at the solution.

  She has successfully completed the assigned task.

- Task 4: The user first decides to use the information on the homepage. She clicks on the section on the homepage entitled "Learn how Heinz grows ketchup". She reads the first few paragraphs of this page carefully, but quickly claims not to find the information.

  She has only partially completed the assigned task. She was in the right page, but could not find the right information.

- Task 5: The user first clicks on the "Recipes" section in primary navigation. She notes that only recipe names are presented and there are no tools on this page to indicate to the system that you are searching for a recipe that uses a very specific ingredient. She is not discourage thanks to the presence of the search bar. She types the string "Heinz Worcestershire Sauce recipe" and receives 3 results corresponding to three different types of Worcester sauce. She clicks on the first and then she notes a reference to the "Caesar Salad" dish in the general description of the sauce. She therefore declares that she has achieved the goal.

  She has successfully completed the assigned task. On the other hand, we must take into consideration that not in all products is there a reference to the dish in which this product can be used. On the contrary, in each recipe accessible from the "Recipes" section there is a precise reference to the product to be used (name of the sauce).

- Task 6: First, the user uses the search bar in the main navigation, searching for the exact name of the product requested in the task. The result is four different types of product (all mayonnaise). She checks the amount of product in fluid ounce and clicks on the correct product (15 fl oz.) At this point, the user begins to have some doubts about whether the products can be bought on the website at issue. She asks questions like: "But can you buy on this website?". In addition, she adds that she would have expected a "Buy it" and / or "Shop" sign somewhere along with shipping information or other purchase information on the same page as the displayed product.

She has successfully completed the assigned task.

- Task 7: The user in this task proves to be particularly confident. Click on the "Our heritage" section in primary navigation and then on the timeline, immediately finding the solution to the task. Once we have been told that we have achieved the goal, he tells us that he had already noticed this page during the execution of a previous task.

2. Tester B: he seems very spontaneous in engaging with the situation, while still taking the test seriously.

    - Task 1: The tester, from the very start, encounters problems in understanding what is meant by “healthy product line”. The misunderstanding is due to the incomplete retention of the information in the instructions. He is looking for an entire line devoted to healthy products, rather than specifically for healthy ketchups. The user first of all clicks on the "Products" section in the main navigation and browse the dropdown menu, not finding any information about light / healthy lines of products. He then moves to the search and types “healthy products”, no results are delivered and the tester seems quite puzzled. Next, he goes back to the initial step: “Products” in main navigation, carrying on the navigation on “Combo Packs” - is not what he was expecting. The final attempt is to explore “Pickles & Relish” in secondary navigation, before concluding that the information is not present in the website..

      She has not completed the assigned task.

    - Task 2: The user first clicks on the "Products" section in the main navigation and "BBQ Sauce" in the secondary navigation. To check if the information is more satisfactory, the tester clicks on “Recipes” in the main navigation. Concluding that following the previous path there were more chances to successfully carry out the task, she goes back to “BBQ Sauce”. One of the various sauces in the section is chosen and the focus in on the picture of the label. Appearing undecided, the user starts scrolling and reading the ingredients. He deduces that that sauce is in line with his allergies and comfortably infers that that is a good way of proceeding to spot the risky ingredients for her allergies. Probing the following souce he founds something he does not know the meaning of and looks for a translation in the browser. When back to the Heinz website, after a short shift of attention to a different interface, the tester notices the “Allergens” and fulfills the requirements of the task concluding that a quick way to check the single product has been found.

      He has successfully completed the assigned task.

    - Task 3: The user checks in “Products” the “Other Specialities” section. Going back to the previous level of navigation clicks on “Ketchups” and further,

sticking to the “Products” dropdown, he clicks on “Mayonnaise”. Eventually he notices the “Flavor Mashups”, even though it was not so straightforward for him to realise that there was a specific section devoted to mix of sauces.

He has successfully completed the assigned task.

- Task 4: The user first decides to click on “Grown not Made” in the navigation bar. Rather quickly “America” is identified as a possible answer. Although he is not convinced and keeps scrolling and exploring the slideshow. He is not convinced, he claims the information to be too generic and would have liked to have more specific information on provenance.

  He has successfully completed the task assigned.

- Task 5: The user first clicks on the "Recipes" section in primary navigation and once in the page uses the “Load more” button. Not satisfied and again to primary navigation chooses “Products”. Here tries few different approaches: “BBQ”, “Combo Packs”, “Gravy” and finally “Other Specialities”; here he finds Worcestershire sauces and selects one of them. He scrolls down, but not finding what he expected. The unsuccessful ride makes him reconsider an already tested way, so questioning his own care when this was was previously undertaken. Therefore, selects once again “Recipes” in the navigation bar and clicks on one of the recipes and reads the ingredients. The user identifies reading the content of each recipe as a viable solution, but not fully convincing. So, he decides to use the search box, where he types *sauce name + recipes*, the search gives not results. Eventually he goes again back to “Recipes”, checking one by one the sauces proposed for each of them. Even if hesitant, he keeps the examination, ended finding a recipe that contains the right sauce.

  He has successfully completed the assigned task. Interesting use of the search box, exploited only in case of indecision to double check a personal guess.

- Task 6: First, the user uses the navigation bar, selecting “Products” and finding the exact one. He looks for a way to buy it, scrolling down the page. He wonders how could a purchase be performed in such interface, suspiciously accounting for the unlikely action to have to send an email to make an order. The tester keeps trying, while stating more than once: “I do not know how to do it!”. At this point, the user goes back to “All Products”, clicks on “Mayonnaise” checks the various sections to then go back again to “Products”. He concludes that he is not sure whether it is possible or not to shop on this website.

  She has successfully completed the assigned task.

- Task 7: The user clicks on the "Grown not Made" section in primary navigation, here there is not what he was expecting. Then, again in primary navigation, chooses “Our Heritage” and then on timeline finding the solution to the task.

Afterward he tells us that he had already noticed this page during the execution of a previous task, but that initially had false memory of where this information was placed.

3. Tester C: She seems comfortable overall, but she does not know English very well.

   - Task 1: The user first of all clicks on the "Products" section in the main navigation and in secondary navigation "Ketchup". She intuitively focuses on “Health & Wellness”, but something seems not convincing enough to her. At this point she starts exploring the other elements in the navigation bar.

     She did not complete the assigned task. From this very first task, the test driver noticed some difficulties in the understanding of instructions and overall of the language of the website (English).

   - Task 2: The user first clicks on the "Products" section in the main navigation and "BBQ Sauce" in the secondary navigation. She explores the various sauces, reading the information about them and selecting those she can eat. Even though she was on the right path, she does not identify the sauces could be suitable for her allergies.

     She has only partially completed the assigned task. Here it has been noticed that the tester uses the browser to go to previous page, instead of the breadcrumbs, concluding that she prefers a function external to the website - probably the one she normally uses to navigate - instead of exploiting one offered by the website.

   - Task 3: The user takes advantage of the navigation bar starting her research of the sauce “Mayochup” by clicking on “Products” and then “Mayonnaise” in secondary navigation; the expected result is not here. She carries on, with the same approach, first clicking “Ketchup”, then “Speciality Sauces”, “Combo Packs” and finally landing in “Flavour Mashup”, where she finds “Mayochup”.

     She has successfully completed the assigned task.

   - Task 4: In the navigation bar the user selects “Grown not Made” and starts reading the information. In the second paragraph she finds that the tomatoes are grown in America. Further on, after quickly scanning the rest of the text, she concludes that the there is no other clue on the origins of the raw ingredient.

     She has only partially completed the assigned task. She was in the right page, but could not find the right information.

   - Task 5: The user first clicks on the "Recipes" section in primary navigation. Once this page is opened, she uses the load more button 3-4 times. Next, the tester goes on “Products” from primary navigation and checks if one would find

a recipe by clicking on a sauce. She is not discourage thanks to the presence of the search bar. She types the string "Heinz Worcestershire Sauce recipes" and receives 3 results corresponding to three different types of Worcester sauce. At this point, she goes back to “Recipes” and clicks on a specific sauce. She declares that it might be that there is a recipe containing “Heinz Worcestershire Sauce”, but that one would need to read all the recipes to find it out.

She has successfully completed the assigned task.

- Task 6: First, the user looks for the present of a shop in the homepage, concluding that there is not one. The next move is to go on “Products” in navigation bar and the “Mayonnaise” in secondary navigation. Observing the layout and functions of the page, the tester decides that the website does not give the possibility to shop.

  She has successfully completed the assigned task.

- Task 7: The user in this task proves to be particularly confident. Click on the "Our heritage" section in primary navigation and from here she clicks “Timeline” in secondary navigation, immediately finding the solution to the task. Later, she tells us that she remembered about “The Complete History of Heinz” as, by chance, she landed here during the execution of a previous task.

The conclusions drawn from the testers’ experiences are the following:

- Thanks to the tests performed, it is evident that the search for a product by category is straightforward and intuitive, while the visibility of the filtering tab results rather low. This problem would be solved by making the tab more visible.

- The ways Task 2 was performed highlighted that the lack of filters or other tools that support a detailed search on user performance play a role in making the search of specific ingredients contained in the sauces heavy on memory load and slow. This issue would be diminished by developing more efficient tools supporting detailed searches with higher focus on the users’ goals.

- The paths emerged from Task 3 provide evidence that the labels chosen for each product category result, at times, not intuitive. On the other hand, the search bar in primary navigation resulted effective for searches that pertain information in secondary navigation, as long as they mirror exactly labels (e.g. not case sensitive, but typos not accepted). The issue could be fixed simplifying some of the labels.

- The searchability of the information requested emerged to be good with respect to the section / page of the website, but lower when it comes to more specific information. This gap could be filled by finding a balance between user and company informational

needs defining a hierarchy of information and providing more visibility to that higher in the hierarchy.

- The paths chosen by the users demonstrated that the website lacks of an efficient and intuitive way to find suggestions on how to combine sauces with dishes. Moreover, the tools provided resulted insufficient to find the information requested. It is suggested to link the recipes that contain a certain sauce in the product items in secondary navigation. It is also suggested to improve the functionality of the search bar by making it rely on a more efficient search system.

- Task 6 was conceived to give suggestions to the design team on how develop the e-commerce shop on the ancillary site. The users positively contribute in giving clues by expressing their expectations. It is clear that certain tools and visibilities are expected when the system into question includes a shop. The following options have been mentioned: a button suggesting purchase options somewhere near the product, along with shipping information or other purchase information, the presence of the shopping cart. The inspection made evident that the shop is expected where the product is or rather in the homepage.

- With respect to Task 7, the information under examination resulted intuitively understandable and easily searchable either using the homepage and using the navigation bar.

2.1 Expert Usability Review (CustomHeats)

2.1.1 Choice of guidelines (CustomHeats)

As stated in the introduction, a second website has been reviewed. In this case, heuristic analysis was entailed, following the 10 heuristics of Nielsen & Molich.

2.1.2 First Inspection of the System (CustomHeats)

The site that is being analyzed is an interactive website with main focus on sauce customization with e-commerce and offering also the possibility to buy ready-made products.

The analysis is focused on the interactive section, as the other parts of the website have been considered not relevant for our purpose.

The “Make Your Sauce” section is in primary navigation in the navigation bar. At first glance, the organization of the content and the graphics make the experience rather confusing.

The textual information instructing the user at the top of the page make it clear that the purpose of the page is that of interacting with the system to create a personalized product, but it does not say anything on how to proceed. Below this information, there screen is vertically divided in two parts: on the left, by clicking a button it is possible to ask for a

randomized sauce - when the “Surprise me” button is clicked, the user is directed straight inside the shop; while on the right part there is a box containing the recipe of the sauce to-be - the recipe is initially set with default values. Underneath there is a further box with price and order information.

Scrolling slightly down it is possible to proceed with the interactive selections. There are three selection steps, plus a fourth step that is the selection of the desired quantity. Here specifics on the steps:

- Step 1: dropdown menu for base selection, easy and intuitive;
- Step 2: clickable images of different types of chillies with visible feedback. On some images the name results difficult to read;
- Step 3: dropdown menu to select a style (“Adventurous”, “Herbs”, “Spices”, “Sweet”) which will trigger a different range of possible ingredients dependent on the choice, ordered in one or more tabs. The quantities of the individual ingredients are selectable on slider bars with single points units and range 1 to 10. Above the tab there is a legend illustrating the values expressed by the range.
- Step 4: the quantity selection is be performed using increment arrows. The arrows are very small and the is no other way to perform the action. Furthermore, the unit of the quantity is not specified.

This four steps are followed by an “Add to cart” button.

2.1.3 Direct Analysis (CustomHeats)

As previously outlined in the analysis of Heinz website, direct analysis consists of a systematic exploration of an application with respect to guidelines taken as a reference. The carried out analysis is pretty systematic: takes into account step by step the parts of the website involved in the sauce customization. For each sector (inaccurately definible “widget”), it has been said which of the 10 Heuristics have been violated. Later (Table 5) a score from 1 to 3 has been assigned to each violated guideline indicating on the one hand the frequency and on the other hand the impact of the violation. The tables below summarize the results of the analysis.

Category	Violated Guidelines
“Surprise Me”	Visibility of system status (1) User control and freedom (3)
Recipe Box	User control and Freedom (3) Consistency and Standard (4)
“Select a Base”	No violations
“Select Peppers”	Visibility of system status (1) Consistency and standards (4)

"Select Ingredients"	Match between system and real world (2) Consistency and standard (4) Aesthetic and minimalist design (8) Help and documentation (10)
"Select Quantity"	Match between system and real world (2) Consistency and standards (4)
"Add to cart"	No violations
"Your Items"	Visibility of system status (1) Help users recognize, diagnose and recover from errors (9)
"Add note"	No violations

Table 4. *Violated heuristics guidelines.*

Violated Guideline	Freq*	Impact*
Visibility and system status	1	2
Match between system and real world	1	0.5
Consistency and standard	2	1
Aesthetic and minimalist design	0.5	0.5
Help users recognize, diagnose, and recover from errors	0.5	0.75
Help and documentation	0.5	0.25

Table 5. Frequency and impact of the violated heuristics guidelines.

*Frequency and impact of the violation refer to the violation of the guideline and not to single errors. The rationale of this choice stands in the fact that some issues are interrelated in a way that imply problems that have to do with the customization process as a whole and not with a individual fault.

2.1.4 Reverse Analysis (CustomHeats)

Heuristic	Difficulties	Opportunities
Visibility of system status	Sauce state changes following user manipulations do not have enough centrality	User manipulations are adequately followed by system status feedback
Match between system and real	Semantic inaccuracy: "a little",	1. The conceptual

world	"medium", "a lot" to express quantities of spices to add might result too colloquial	metaphor used for making the sauce is that of selecting ingredients; 2. The selection is presented as a series of steps as in "Your recipe".
User control and freedom	In the cart is not easy to reverse actions (no undo and redo nor extended dialogues)	So many ingredients options offer an high margin for interaction
Consistency and standards	The same concepts are named differently in different sectors (e.g "sub ingredients" does not have this label elsewhere)	More consistency would reduce memory load
Error prevention	No build-in way to go back to customization after entering the online shop	
Recognition and recall	1. Problematic in the ingredient selection phase, too many options poorly presented; 2. The image uploaded when creating the custom label is not visualized anywhere.	1. "Your recipe" part helps user keep track of previous choices 2. Once in the online; shop you keep having recap from the cart also when filling in shipping information.
Flexibility and efficiency of use	There is only one way to make operations	There could be accelerators in order to speed up interaction for expect users
Aesthetic and minimalist design	Written suggestions are too small. Labels on chillies are too small plus chosen font results unclear.	There is space for improving contrast, repetition, alignment and proximity, in particular in "Recipe", "Select peppers" and "Select Ingredients"
Help users recognize, diagnose and recover from errors	The system prevents major errors. No evidence of help in diagnosis and recovery under standard circumstance	
Help and documentation	1. There is not contextual help nor help tips; 2. Clicking on "I agree with Terms and conditions" the user ticks the box. You can access them only in footer.	Live chat

Table 6. *Results of the Reverse Analysis.*

2.2 User testing (CustomHeats)

2.2.1 Definition of the testing protocol

In the planning phase, it has been decided to analyze (see previous analyses) and to test a website we chose as a driving model to engage the interface for the subsite, the one used as an e-commerce platform. The website tested corresponds to CustomHeats website.

Here the same protocol defined for “Heinz” website was used. The tests carried out on real users have allowed us to make credible, realistic and demonstrable considerations on the system, starting from the problems encountered by users. The diagnosis of such problems has been the basis for improving the usability of the system and in particular of its functionalities we are designing.

CustomHeats is a platform that allows users to customize their own hot sauce. Users can design their hot sauce the way they want it with over 70 ingredients. The process of making a customized sauce is divided in four steps:

1. The user has to select a base sauce
2. Then, she has to select a particular type of chili pepper
3. She has to select her favorite ingredients to make the sauce she wants
4. Then, there is an optional step: she can upload her label design (previously created not on the platform on issue) to attach to the bottle of the customized sauce.

The user can also decide to make the system select the ingredients. Simply clicking on a button called "surprise me" in the "make your sauce" selection, the system will make sure to cook up a special recipe that is guaranteed to be a hit.

The User Testing of CustomHeats website is fundamental, since its analysis will be necessary to redesign functionalities that will be taken up in the application from the point of view of usability. In fact it is our driving model. Also in the case of the website at issue, the first decision that must be made regarding the User Testing is to decide which type of test to perform. For the analysis of the driving model website, a common sense test has been adopted. Specifically, a *Discount Usability Testing* has been performed by three different users.

The chosen protocol, the *Informal Thinking Aloud*, requires users who are taking the test to think literally aloud during the test, expressing their thoughts, doubts and reflections on the steps to reach their goal. The testers have been selected depending on their characteristics in a way similar to the characteristics of our target user.

Later in the documentation, testers will be referred to by using their alphabetical identifier. It is very important to underline that every user selected to test the website in question does not know the system and has never used or visualized it before.

The testers are the following:

1. Tester A: A 38-year-old journalist, single for a short time. He works hard during the whole week, but when he has some days off, often travels never without friends or colleagues.
2. Tester B: A 24-year-old female Business student, engaged to a man who lives very far from her. Whenever she has any doubts, she consults a book called "The little book of answers" and she would like to have the tarot read, but her boyfriend forbids it.
3. Tester C: A 30-year-old son of an entrepreneur, he lives in a flat by himself. When he comes home after working with his father, he love listening to vinyl records.

The device on which the tests have been performed are a MacBook Air and an iPhone 7. No tablets have been used since the mobile version of the website is identical to the version for tablets. The browser used has depended on the habits of the users to whom the test was submitted. Two users have used Google Chrome, the other one Safari.

At the beginning of the test, the site had already been opened on a particular browser chosen by the user who was going to perform the test. At the end of each task the user it was not requested to return to the homepage, but all the tester went back to the homepage, probably because starting from the beginning in an ostensible default situation made them feel precise, clean and confident

The tasks to be performed by the testers are four. They are useful for obtaining indications regarding the usability of the system being designed. They have been expressed in Italian since all the test participants were Italian. They are the following:

Number	Task	Goal
1	Create your own "Wings" based sauce, with Habanero chilli, leaving the rest of the ingredients unchanged - and so as the default system sets them	Testing the visibility and effectiveness of the drop-down menu and images for the choice of ingredients.
2	Create your own “Red Pepper Sauce” based sauce by adding the spiciest hot pepper available. Buy three bottles of this sauce	Testing the visibility and effectiveness of symbols to choose the degree of a characteristic of a sauce.
3	Create your own "Wings" based sauce by adding the maximum amount of the most popular ingredients	Testing the visibility and effectiveness of a means to filter the ingredients and of a tool to choose the degree of quantity of a particular ingredient.

4	Buy a sauce letting the system decide the ingredients, then set up a new customized label. Before proceeding with the purchase, leave the following text as a note to the company: "You will not find me at home from 9 to 10 am"	Testing a tools to create a random sauce, a tool to customize the label of a bottle and a tool to leave instructions to the delivery man.

Table 7. User Tasks for evaluating CustomHeats service.

Task 1 is necessary to check how and how long the user - who first sees and uses the system - takes to learn how the system works. It is also necessary to understand if the use of the system at issue generates misleading in the user. The goal is to understand how a user approaches the system for the first time without having previous knowledge about it.

Task 2 is necessary to understand the effectiveness and accessibility of the choice to set the indications regarding the spiciness of the peppers directly on the images of the peppers, and then to insert an apparently clickable scale in which we find the values "A little", "Medium" and "A lot" could in. The objective is to verify if the user is able to set the desired degree of spiciness in an easy, intuitive and quick way and if she is able to realize that that scale does not indicate various degree of spiciness. Since each value on the scale corresponds to an icon of a flame of a different size, the user might think that the scale refers to the different degrees of spiciness that can be set.

Task 3 is used to check whether users are able to use the system that allows to set the quantity of ingredients to be inserted into the sauce. In particular, we want to understand if users can correctly quantify the desired doses taking as a reference the scale of values superimposed. Eventually, we want to verify if the label “*Highlighted Ones Are Our Most Popular Ingredient” is visible enough.

Task 4 is necessary first of all to understand if the process for proceeding with the purchase is clear to the user. In particular, we want to test the following system features:

- the system allows the user to create a sauce in a random manner by clicking on the "Surprise me" button.
- The system allows her to customize the sauce label by uploading her personal label in different formats.
- The system allows to leave comments or instructions to the company before proceeding with the purchase.

The steps of the performed test are identical to the step of the previous test on Heinz website.

2.2.2 Testing

For each tester, the evidence, the results following the execution of a task, comments, suggestions, reflections and mental processes expressed during the test are reported. This information will be useful in the design phase for a more accurate study of usability.

1. Tester A:
    - Task 1: The user first notes the section entitled "Make your sauce" in the main navigation, so with security he clicks on it. Then, he takes a general look at the page, scrolling it quickly. Afterwards, he goes back to the top of the page. He notices quickly the word "Select a base" and he says that he is already convinced that he has arrived at the solution. In fact, he clicks on the drop-down menu and successfully selects the "Wigs 5oz / 148mL" option. Then he looks for the Habanero pepper among those shown below. He claims to have already seen the pictures of the peppers, so he finds that specific chili immediately.

      He has successfully completed the assigned task.

    - Task 2: The user repeats the same actions as before safely. He clicks on the "Make your sauce" section in the main navigation and then on the drop-down menu that finds in the page. So, he clicks on the "Red Pepper Sauce 5oz / 150mL" option. Later he starts looking for a way to find the spiciest pepper, scrolling the page. He notices at some point a scale on which some values are shown in ascending order. Above each value there is a fire of dimensions proportional to the value. He is convinced to get the solution and clicks on the value “10”. Not receiving any feedback, he tries to click on the fire that is above “10”. Once again no feedback, so he argues that probably that is not the solution to set the maximum spiciness. Then, he opens a drop-down menu under the "Select ingredients" title, but he finds nothing that can refer to spiciness. So, he declares that he will try to go around the page because he cannot understand how to find the solution. He notices the presence of a tab in which there are two sections, one entitled "1", the other "2". Since by default the section “1” is opened, he opens the “2” section, reads some ingredients, but declares that he finds no solution. He returns to scroll the page and focuses on the photos of the peppers. After observing them for a few seconds, he realizes that above them there are drawings of fires, as many as the single pepper is more spicy. He claims to have arrived at the solution and recommends inserting the drawings of the fires under the images.

      He has successfully completed the assigned task, but with difficulty. Actually, it is too difficult to distinguish the spiciest chili peppers and the scale confuses users, since it does not seem an image, but a clickable scale by means of which it is possible to set the spiciness of chili peppers.

    - Task 3: The user starts the task and he feels confident. He selects the "Wings" base from the "Select a Base" drop-down menu, claiming that he does not like the menu graphically. Then, he starts looking for the most popular ingredients. He probably expects a special section dedicated to the most popular ingredients, so he keeps scrolling the page. He claims not to know the solution, so he keep on scrolling the page, but then notices the heading "* Highlighted Ones Are Our Most Popular Ingredients". He immediately thinks that it is a

button, since this writing has a colored background, then he clicks it. He stops trying to figure out if something has changed on the page after clicking that apparent button, but it doesn't receive any feedback. He then decides to click on the "2" section of the tab to see if anything has changed there. He realizes that some ingredients have the same background as "* Highlighted Ones Are Our Most Popular Ingredients". He therefore claims to have come to the solution.

He has successfully completed the assigned task, but with difficulty.

- Task 4: The user clicks once more on "Make Your Sauce" section, immediately clicks on the "Surprise me" button on the page and says he is convinced that this button will create a sauce in a random manner. He is redirected directly to the cart, where he does not check if there is actually a sauce of which the ingredients are known or unknown (the "Surprise me" command does not select ingredients in a random manner, but prevents the user from seeing the ingredients with which the sauce will be prepared, so that the user receives a sauce at home that he did not expect and of which he knew nothing, as a surprise) and is not surprised to have been sent directly to the cart. At that point, he scrolls the page very quickly and notices a title called "Any comments or special instructions?". He clicks the "Add note" button below, so a textarea is expanded. He inserts the requested text and declares the task completed successfully. Then he reminds that the label had to be changed, so he scrolls the page until reading “Add Custom Label To Your Sauce”. He uploads an image stored on the device clicking on the first “Scegli file”. No question about

  He has successfully completed the assigned task.

2. Tester B:

   - Task 1: The user, after a moment of hesitation probably due to the beginning of the test, immediately sees the section called "Make Your Sauce" and clicks on it. The first thing that she instinctively does is reading the recipe that is shown in the top-right of the page, probably thinking that from there you can change the ingredients shown. Then, she claims to have been wrong in reading that part, because it is not useful to the task. So she takes a general look at the pages and notices the "Select a Base" heading. She says she has come to the right place. She clicks on the drop-down menu and selects the "Wings" base. Then, she scrolls down the page to go ahead with the task. When she sees the pictures of the peppers, she comes up to the computer screen to read their names. She finds the name "Habanero" and clicks it. Then, she scrolls down the page to verify that the other ingredients remain as default. She notices a drop-down menu under the heading "Select ingredients" and insecurely says that the selected ingredients are called "Adventurous" and that perhaps you should therefore leave this option selected. She is insecure, so she checks also the other ingredients shown under the tab. She continues to be insecure: she

claims that these are the predefined ingredients, but it seems strange to her that their quantity is 0. In any case she just lets it go and says she has reached the goal, but always with insecurity.

She has successfully completed the assigned task.

- Task 2: The user clicks on "Make your Sauce" section and immediately notices that the required base is already selected by default. Then, she immediately goes to the section dedicated to chillies to look for the most spicy chilli, probably believing that some information on them would be available. After a moment of hesitation, she notices that on the images there are fire symbols. She explains that surely she got the solution, but those symbols are in the same color of the images and in her opinion this does not work. She explains that in the previous tasks she had not noticed the symbols, but she noticed them only in this phase of the test because the task implicitly required to focus attention on the peppers. Keeping on with the task, she types the required quantity of bottles in the correct form. So, she declares she got the solution, putting an end to the task.

  She has successfully completed the assigned task.

- Task 3: The user clicks on "Make your Sauce" section and selects exactly the same sauce base as in the previous tasks. Then, she scrolls down the page to go ahead in the task. The section of the page under the sauce bases is the one dedicated to chillies ("Select peppers"). She realizes that she was not asked in the task to select a particular type of chili pepper, but she selected it the same, thinking that it was mandatory to do so. Then, she scrolls down the page to look for the most popular ingredients. She expects a dedicated section, but then she almost immediately notices the words "* Highlighted Ones Are Our Most Popular Ingredients". From this, she realizes that she must search among the ingredients for those with an asterisk nearby. Not finding asterisks in the tab section "1", she goes to tab "2". There she sees that some ingredients have the same background color as "* Highlighted Ones Are Our Most Popular Ingredients". At this point, she set the correct maximum value for each ingredient, then she double checks to have done well in each ingredient. During the check, even if previously it was explained that it was not allowed, she spontaneously asks the team if the maximum quantity has been set. The team again explains that it is not allowed to answer the user's questions, then she checks again one last time and then says she has reached the goal. In the control phase, she never refers to the scale of values above the ingredients because she has never noticed its presence. She is too frustrated and tired to remember to finish the task. When the test driver says her that the task required also to set three bottles to buy (reading again the task), she gets to the right form in the bottom of the page ("Select quantity") and inserts the right number of bottles required. She says that she has already noticed that form.

She has successfully completed the assigned task.

- Task 4: The user clicks on "Make your Sauce" section and once arrived at the page she immediately clicks on the button called "Surprise me", explaining that she had seen it before and that surely it serves to create a random sauce given its name. By clicking on the button at issue, she is sent directly to the cart. There she immediately sees the title "Add Custom Label To Your Sauce" and claims that she has just found the right place to set the custom label. She does not understand, however, why the system asks her to upload the label three times. Not reconnecting the fact that in previous tasks she had already added products to the cart, she does not understand that those labels are one for each different bottle. She tries to think without taking any action on the screen. She then decides to upload an image stored on the MacBook she is using. After the upload, she asks the team what has happened differently than before, since the uploaded image has not been shown anywhere. She reflects a few seconds and becomes convinced that the image has been loaded correctly. Finally she scrolls the page and easily notices the "Add note" button. She adds the note and says she has finished the task.

  She has successfully completed the assigned task.

3. Tester C:

- Task 1: The user clicks on "Make Your Sauce" section and, after arriving at the page, quickly scrolls down the page to get a general overview of its content. Then, he goes back to the top of the page and scrolls more slowly to understand better. He comes back up and stops to read the first words that catch his eyes. He sees the "Select a Base" heading and down below a drop-down menu. He clicks on the menu and selects the required base. He comments that for now he arrived at a first solution. It then continues with the task in a very convinced way. He had already noticed the images of the peppers during the overview of the page, so he goes straight into the section and selects the correct pepper. Take a look at the drop-down menu entitled "Select ingredients", clicking on it and reading the various options. Then look at the ingredients underlying the ladder, reading some aloud and say that these should be left unchanged, as well as the pre-selected option in the drop-down menu. Declares the task complete.

  He has successfully completed the assigned task.

- Task 2: The user clicks on the "Make Your Sauce" section and quickly takes the first point of the task, selecting the required basic sauce. He keeps on with the task with conviction, going to the section dedicated to chillies. He looks at the peppers and reads their names quickly and chooses the right one, being able to distinguish the symbols of spiciness from the background.

He has successfully completed the assigned task.

- Task 3: The user starts clicking on the "Make Your Sauce" section. He selects the "Wings" base from the "Select a Base" drop-down menu. Then, he starts looking for the most popular ingredients scrolling the page. Since we are speaking of "ingredients", he stops scrolling the page after getting to the section dedicated to ingredients. He starts to read some of the default ingredients aloud, but he finds no information regarding that. So, he decides to keep on scrolling the page, but this time in a very slow way, to pay more attention on every word potentially useful to solve the task. He find "* Highlighted Ones Are Our Most Popular Ingredients" text, so he claims he is getting nearer and nearer to the expected result. He reads carefully the sentence at issue, so he understands that he has to read the ingredients and finds the highlighted ones. He starts to read the set up ingredients again by default, but no popular ingredients and no awareness that there is a tab. At a point, he realizes that there is a tab, so he tries to shift from the "1" to the "2" section of the tab. He is glad to say he has come to the solution. It then quickly searches for a section where it is possible to enter the desired quantity of products and set the required number, completing the task.

  He has successfully completed the assigned task.

- Task 4: The user quickly scrolls the page, doing an overview of the page. He notes very quickly the "Surprise me" button and says he is convinced that this is the right command. He clicks it and is immediately redirected to the cart. There he takes a look at the page and first notices the "Add note" button. He does not add the note immediately because he claims to prefer to do this task later, after finishing the general overview. Then he notes the section dedicated to uploading labels, so he clicks on "Choose file". He adds an image stored in the device he is using, then he scrolls down the page and adds the note.

  He has successfully completed the assigned task.

The conclusions drawn from the testers' experiences are the following:

Task 1: The "Make your sauce" section in the primary navigation is visible. The "Select a base" drop-down menu is visible as well. The tool to select ingredients by their image is effective.

Task 2: In most cases, users were not able to recognize the symbols placed on the image immediately. This feature must therefore be redesigned. For example, you could place the symbols below the images, just as users expected.

Task 3: The indication and filtering of particular ingredients by means of an inscription under all the ingredients and its background is not sufficiently functional. A system that uses checkboxes, for example, would be more functional.

Task 4: The command "Surprise me" to create a sauce in a random way is visible and functional, as is the button for leaving instructions to the delivery man. Understanding how to customize bottle labels is not instant and intuitive and feedback is not enough. This part needs to be redesigned. You could present the image of a bottle and next to it the "Custom the label" button. When the label has actually been customized, a new label should appear on the bottle.

2.2.3 Analysis of subjective and objective data

Following the tests on Heinz website, it has been possible to gather all the useful data from them and draw some interesting conclusions:

- Task 1: thanks to the tests performed, it was evident that the search for a product by category is straightforward and intuitive, while the visibility of the filtering tab results rather low. This problem would be solved by making the tab more visible.

- Task 2: the ways this task was performed highlighted that the lack of filters or other tools that support a detailed search on user performance play a role in making the search of specific ingredients contained in the sauces heavy on memory load and slow. This issue would be diminished by developing more efficient tools supporting detailed searches with higher focus on the users' goals.

- Task 3: the paths emerged from this task provide evidence that the labels chosen for each product category result, at times, not intuitive. On the other hand, the search bar in primary navigation resulted effective for searches that pertain information in secondary navigation, as long as they mirror exactly labels (e.g. not case sensitive, but typos not accepted). The issue could be fixed simplifying some of the labels.

- Task 4: the searchability of the information requested emerged to be good with respect to the section / page of the website, but lower when it comes to more specific information. This gap could be filled by finding a balance between user and company informational needs defining a hierarchy of information and providing more visibility to that higher in the hierarchy.

- Task 5: the paths chosen by the users demonstrated that the website lacks of an efficient and intuitive way to find suggestions on how to combine sauces with dishes. Moreover, the tools provided resulted insufficient to find the information requested. It is suggested to link the recipes that contain a certain sauce in the product items in secondary navigation. It is also suggested to improve the functionality of the search bar making it rely on a more efficient search system.

- Task 6: this task was particularly conceived to give suggestions to the design team on how develop the e-commerce shop on the ancillary site. The users positively contribute in giving clues by expressing their expectations. It is clear that certain tools and visibilities are expected when the system into question includes a shop. The following options have been mentioned: a button suggesting purchase options somewhere near the product, along with shipping information or other purchase information, the presence of the shopping cart. The inspection made evident that the shop is expected where the product is or rather in the homepage.

- Task 7: the information under examination resulted intuitively understandable and easily searchable either using the homepage and using the navigation bar.

Following the tests on CustomHeats website, it has been possible to gather all the useful data from them and draw some interesting conclusions:

- Task 1: The drop-down menus are effective, the user understands and perfectly knows how to use them. Moreover, this only applies if the lists they make available are not long. Plus, they don't like graphically. Also the choice by image pleases and works.

- Task 2: The choice by image pleases and works. The important thing is that all the information on the image has to be not reported on the image itself, otherwise the information becomes difficult to read due to the noisy background.

- Task 3: For the indication and filtering of particular ingredients, it is better to use systems such as checkboxes and radiobuttons because they are more visible and more functional.

- Task 4: Whenever something changes in the system, there must be adequate feedback.

2.2.4 Urgency Curve

As reported in the previous paragraphs, the data generated by the test have been organized and illustrated. Further, the errors detected have been described, specifying their phase of detection (expert usability review or user testing) and quantitatively classified on a scale 1 to 3, according to frequency and impact.

Eventually, the errors have been positioned on a bidimensional chart, impact vs frequency, according to their classification scores. It was decided on a 1.5 urgency threshold and a curve was drawn in order to separate severe errors from mild ones. To conclude, as illustrated in the graph below, the errors laying above the curve are those who need immediate action, those below the curve can wait until next release to be fixed.

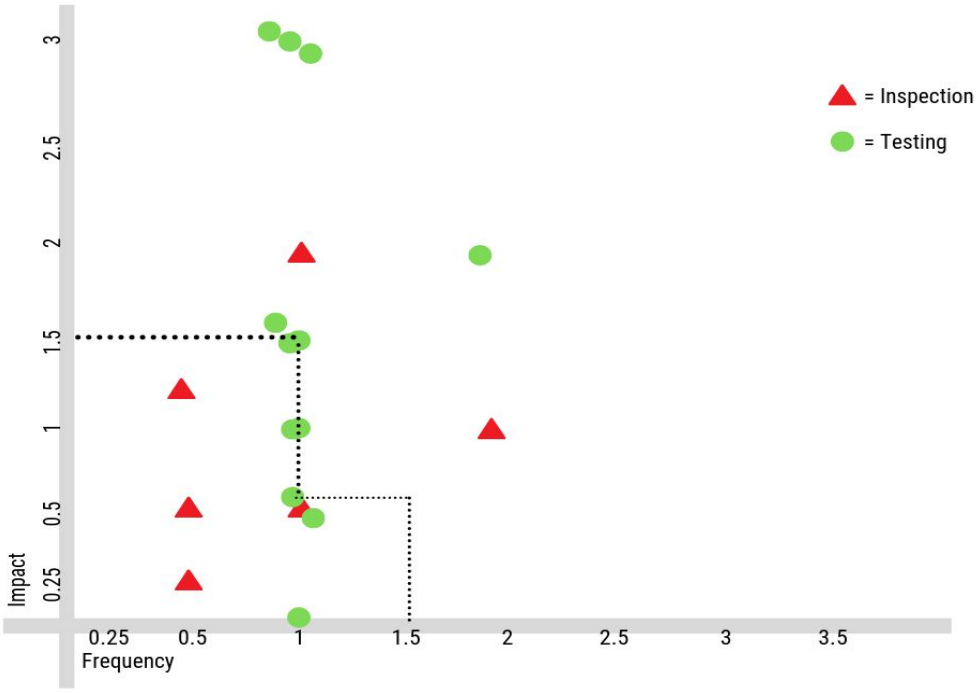

Image 13. Urgency Curve for CustomHeats.

3. Feasibility Study

> *"Allora voi sapete che tutti i programmi, tutte le fiction di tutte le reti di tutti palinsesti ruotano intorno ai dati auditel. Noi no! Noi no! Noi tiriamo dritti signori, oggi più che mai! Perché noi facciamo questo lavoro seriamente e per altri due motivi: A, siamo dei professionisti; B, perché siamo persone che stanno raccontando una storia, la storia di Occhi del cuore. Oggi più che mai signori, voglio che dimostriate quello di cui siamo capaci. E dai, dai, dai! Dai, dai, dai!"*
>
> (René)

Following the identification of a proposal, the feasibility study constitutes an important defining moment to evaluate the actual viability of a design path. It helps better defining the necessary elements to shape the realization phase, make explicit the requirements and possibly design alternatives. In the specific case, we want to design the full meaning and function of an online interactive service for sauces customization hosted in a subsite, hooked to our mother company website. In this phase, content-wise, the subsite is conceived as a sales driver and provisionally designed only for "Ketchup", Heinz iconic and core product. The systems allows the target user to make special the legendary Heinz ketchup, especially suitable for her needs and taste, while not giving up the security of a touchstone label. Context of use (3.1), scenarios (3.2) and personas (3.3) have been defined.

3.1 Context of use

In the context of preliminary studies in analysing our website, it is important to focus on the feasibility of the project. This means that we are planning to analyze more in depth:

- who are the intended users and what are the tasks
- what are the technical and environmental constraints

In this context, this kind of analysis is essential to contextualize our further operations and conceptualisation, and more concretely, to understand if our idea may have an actual business and, if it is true, which are the main aspects we have to analyse in order to categorize our target to make it work.

Who are the intended users and which are their desired tasks?
As argued in section 1.1 and 1.2, our target segmentation comprises people belonging to the medium-upper class, within an age range between 16 and 39, interested in quality, eco-friendly products and/or products which manifest to other a particular *status-quo*. For a more accurate analysis on our segmentation, please go back to section 1.

Target's tasks when approaching our website are about:

- Product Customization
  As an Heinz's branch-site, it has a particular, strict main goal: give user the possibility to hyper-customize the desired products. In this context, we conceptualize various needs that users may have in customization of sauces:

  - Sauce Customization:
    As section 1.2 highlights, this is the aspect considered as most prominent by the surveyed people.
    - What sauce: Ketchup;
    - Choose raw ingredients that fall within certain boundaries that respect ethical and environmental issues as well as personal preferences (for example: vegetarian, vegan, eco-friendly products, etc…);
    - Opt for ingredients which are different for each sauce. The website provides the possibility to choose some particular ingredients. (i.e. in customising ketchup, the user can decide whether to use a tomato variety or another depending on preferences or needs);
    - Order of ingredients' addition;
    - Consistency: liquid, creamy, semi-solid;
    - Quantities of ingredients: "poco", "abbastanza", "tanto";
    - Quantity of products to purchase.

  - Package Customization:
    - Materials (glass, Heinz plastic, recycled plastic, aluminium): the environment-friendly options are highlighted.

  - Label Customization:
    - Label template;
    - Choice of colors through the provided palette (which matches Heinz color palette);
    - Insertion of textual content;
    - Font of the textual content.

- User Assistance:
  - Simple, easy, assisted purchasing process;

- Final Recipe:
  - The sauce customisation process is finally printed as a downloadable and printable recipe

More specifically, the core functionality of the system is Product Customization. It focuses on the personalization of three aspects of the product: Sauce, Package and Label.

Sauce Customization is managed through an intuitive and interactive interface that nods to the way sauces are realistically prepared in a kitchen. The interface shows the process of preparing a sauce in its completeness, with sequential and parallel stages that concern different elements influencing and intertwining with each other (such as ingredients, order of

insertion, etc…). The user controls the development of the process through a *gamification-based* approach. During the whole process, a virtual assistant gives step-by-step advice to users for helping them with system functionalities such as choosing ingredients and combining them according to a number of different factors (i.e. if the ingredient is supplementary it cannot be added until all the mandatory ones have been inserted). Useful and entertaining trivia are shown following the performance of each and every manipulation in order to keep the users' attention and optimize the information flow by making the most out of a technical constraint.

Package Customization follows immediately after the process of Sauce Customization. Based on the information obtained through the interviews and the survey (for more information refer to sections 1.1 and 1.2), it has been decided that this process should focus on the users' choice about the *material* of the product package, with special attention given to environment-friendly and eco-sustainable matter such as glass.

Label Customization completes the customization process by giving the users the possibility of tailoring the design of the label on the product package to their own preferences and / or needs. Label Customization pertains to the personalization of background theme and colours, textual content and fonts. A series of label templates, each of which is characterized by a particular and charming style referring to its respective imagery, is provided.

This kind of purchases can be done from laptop, smartphone and tablet. It can be done at home, but also while commuting after work. This requires an easy access to the subsite from multiple devices. However, a possible technical constraint could lie in size and weight of the web app, which could result in efficiency decrease on less powerful devices.

3.2 Scenarios

Scenarios are detailed descriptions of what users do with the product and why they do it. They are a tool used to design and validate the usability of a system. During the design process, scenarios are used to keep the various implementation stages under control and relevant to the user experience by choosing solutions that cover actual problems of people that fit the user segment. During the validation process, scenarios allow to identify applications to delve into through research and testing.

Typically, scenarios are characterized by four types of elements:

- characters: a scenario has at least one main character and possibly one or more secondary character(s), if needed;
- problem: a scenario revolves around some kind of problem that characters have to overcome;
- actions: a scenario is also characterized by a set of actions that characters operate in order to overcome the problem at hand;
- epilogue: a scenario closes with the resolution of the problem.

In conclusion, user research allows to clarify what target users think and do. Results get summarised in *personas*, *scenarios* and *use cases*. These elements enable designers to tune the system according to new solutions based on practical experience of real people. Stories created from people's experiences and scenarios constitute the supporting frame of any user experience design project: together they contribute to the creation of a solid product tailored to the final user who will try out the system and use it over and over again.

The scenarios that have been developed for the project are:

1. A man wants to give a customized sauce to a friend as a gift for his housewarming party. His friend is allergic to basil and aware of the environment. He is also a hopeless glutton who loves to eat all the kinds of different food, especially with other people. The user has to customize the product as follows: the sauce must come in the enough for a party; the sauce must be *lemony thick ketchup*; the bottle must be made of glass; the label has to be themed adequately for the event.

2. A food-blogger bumps into new Heinz customization proposal and he is enthusiastic about it. He wants to review the application, so he uses the service to make a spicy ketchup, a parmesan flavoured one and a cooking Ketchup, more liquid in texture. He orders the customized sauces and starts planning the set design for a shooting to integrate in the post for his blog.

3. A woman is on her way from work. She is scrolling through the news on the phone and finds out about the new project of Heinz which revolves around the idea of Extreme Customization. She decides to try it out, having her attention drawn by the recreational aspect of the application in order to pass some time.

4. A young couple is going to have a baby. They are organising a baby shower to tell their friends the child's sex. It will be a barbecue next to the house's pool. They will invite at the party among 30 people, most of the invitees will be young people and couples, many of them with children. The invitees can be considered as hipsters active on social media. Their main interest is to find most of the party's detail matching the baby's sex corresponding color. Additionally their focus is on healthy and tasty products that both adults and kids may like.

5. A local businessman owns a bar, which is famous for its happy hour among young people of the city. Additionally, there is also a waitress working in the shop. While leading the small activity, the owner and the waitress are really busy. They thought about creating their own sauce, but they have no time to prepare it for the everyday happy hour. Surfing on the Internet, the waitress found "Pimp my Heinz" and especially liked the possibility to customize package and label of the sauce. She told about her idea to her boss: a personalised sauce in terms of flavour, package and label may give to their business an extra touch. The owner is very pleased about the idea, also considering that Heinz is a trustworthy, worldwide company focused on product quality. Additionally, they thought about a competition between clients to customize

the Ketchup label: the group which makes the prettier bottle, will win an *aperitivo* for free and they will then use it as a new sauce bottle for their bar.

3.3 Personas

Personas are characters that represent abstract archetypes of target users' intentions, purposes and uses with respect to the product. It is necessary to identify some details about the personas and their stories, before defining the tasks. In particular, for each persona, it is necessary to define their motivations, behaviors, preferences and personal stories. A good persona should represent a specific but balanced category of users: a story based on an interesting person with some specific peculiarities could be useful in analyzing typical users and in identifying how they would interact with the product.

Francesco Lucchese is the protagonist, that persona for which the system is created. His profile corresponds to that person who is interested in both the product specificity, but also the interactive and informative "game-like" part. He identifies as the target to which the system is designed in order to encounter his needs and preferences.

Image 14: *Francesco Lucchese*'s personal card.

Cinzia Ferri and Gennaro Esposito have been identified as secondary characters due to their interests. Cinzia and Gennaro can find the products they are searching for on 'Pimp my Heinz';

for them, the ludic and informational part is just an additional feature, and maybe they might have some problems with the amount of time required to complete the process to have the sauce they want.

Image 15. *Cinzia Ferri*'s personal card.

Itame 16. *Gennaro Esposito*'s personal card.

Rosa Romano, Caterina Fiore, Antonio Moretti are the additional characters. They represent the kind of user that is neither primary nor secondary and that is overall satisfied with the system. Rosa's reason is fundamentally based on her wish to have some sauces in the fridge to combine with her vegan food delivery. Caterina would like to buy customized Heinz sauces to take a photo with them and post it on Instagram, since they are exclusive products. Antonio could buy some sauces by Pimp my Heinz to check better the ingredients to make a sauce.

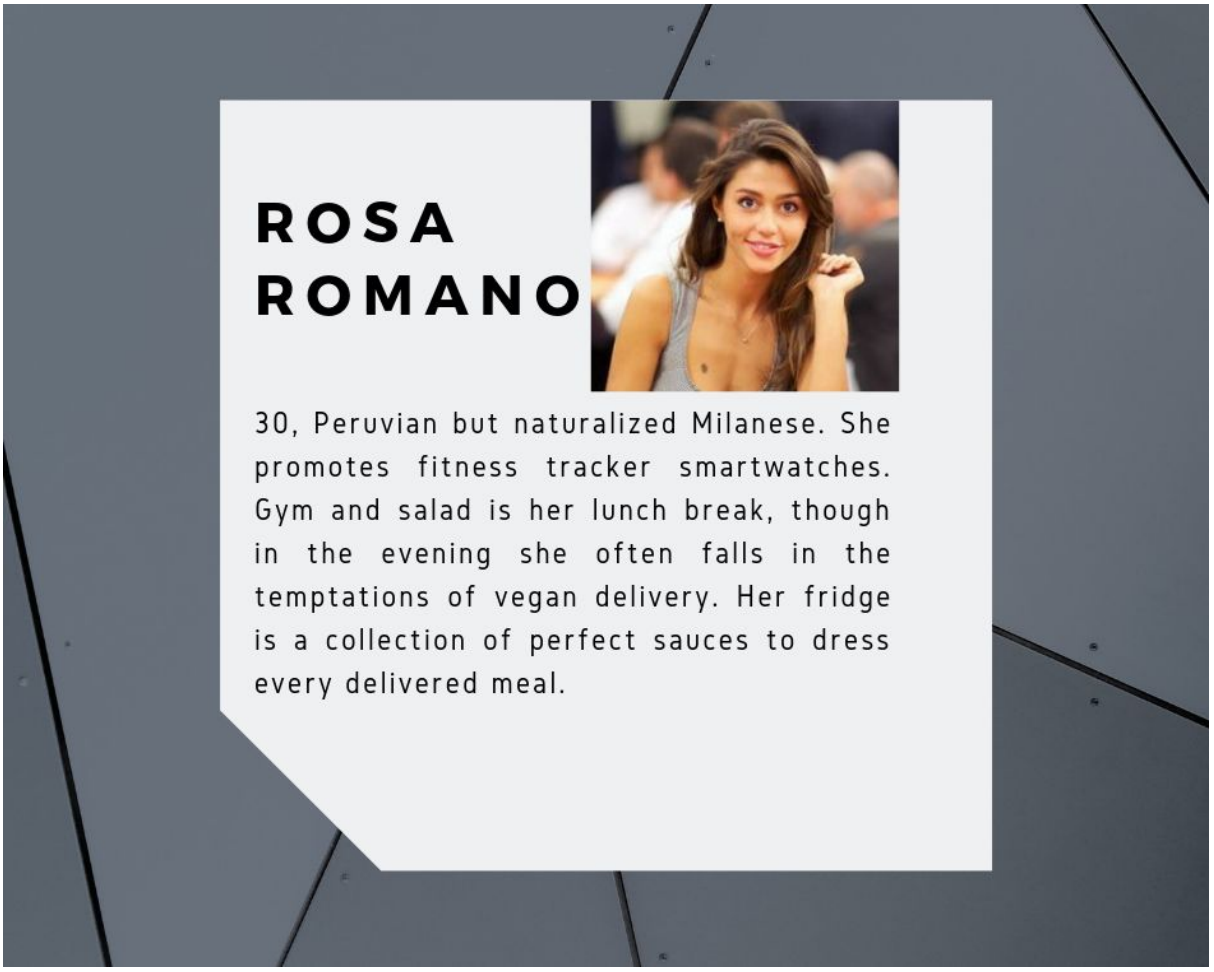

Image 17. *Rosa Romano*'s personal card.

Image 18. *Caterina Fiore*'s personal card.

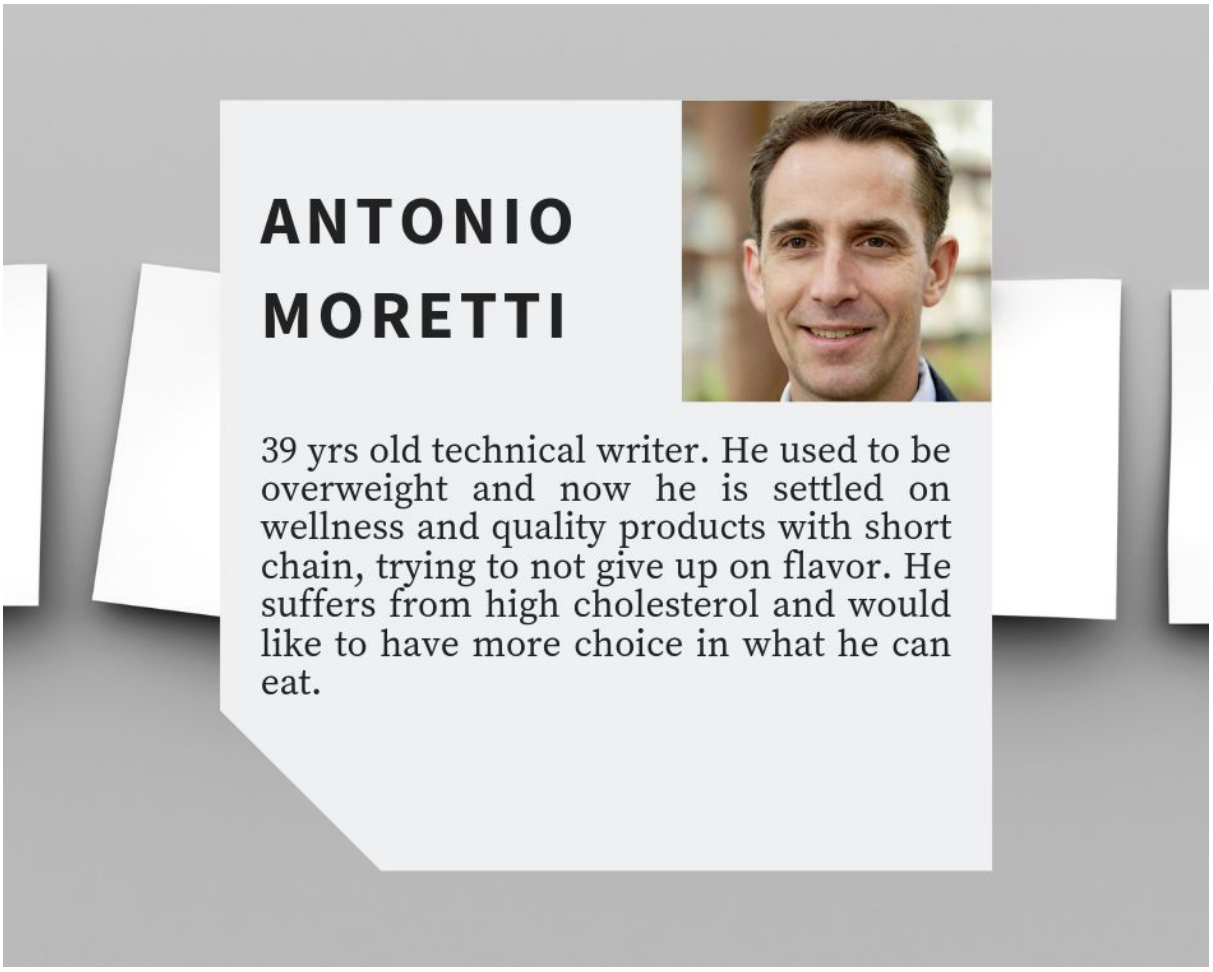

Image 19. *Antonio Moretti*'s personal card.

4. Design Proposal

"L'artista, per definizione, fa quello che gli pare".

[Brusini a René]

4.1 Information Architecture

Information Architecture is the practice of deciding how to arrange the parts of a system in order to help users find information and complete tasks. It focuses on structuring, classifying, organizing, findability and manageability of information content in an effective and sustainable way and defining how the elements that constitute such content relate to each other within the system. Information Architecture is solid and well-built whether it identifies adequate word choices, informs user interface design and defines interaction strategies.

Users should enjoy the experience as well as the final product. In order to make that happen, the Information Architecture must allow them to follow the flow that is constituted by each possible action with respect to the system in a simple and natural way, avoiding as much as possible difficult or unclear tasks and information.

Considering this initial analysis, a top-down approach to information architecture has been chosen. In a top-down model, a general structure of the system is formulated without delving too much into detail for any of its parts. Every part of the system is progressively refined by adding more details from the earlier design stages. The specification continues until that part is deemed to be sufficiently detailed. Comparing this model with the bottom-up approach, this model seems to be best way to appropriately and organically design which information is managed by the system with respect to what has been established until now.

The system is meant to be comprised in several parts, but all of them have to be connected to enhance the main functionality: the product's extreme customization. This is the actual core of our project, which is full of interconnected parts with multiple interconnected information. So, it is appropriate to have in mind the entire project idea and goals, in order to adequately develop the relations among the details.

First of all, it is necessary to focus on the system's goals. They overall revolve around the development of a innovative system that allows a participatory process, in which the users are enabled to sensibly contribute to the creation of a product that is specifically tailored to their preferences in order to build their loyalty.

In order to satisfy the overall system's goal, we divided it into sub-needs. Each sub-need has to be satisfied by a dedicated system section:

1. *A clear starting point* → Ancillary Site Homepage ("Home")

2. *A core function that allows the extreme customization of the product* → "Crea la tua salsa"
3. *Additional information and support* → "Contatti"
4. *A function that allows the user to get the extreme customization output* → Cart

All the four above mentioned system's sections will mandatorily contain:

- *To provide links to other pages and sections of the website* → Navbar. The navbar has to contain the links to the following sections/parts:
  - Heinz main website;
  - "Pimp my Heinz" homepage;
  - "Crea la tua salsa";
  - Contatti;
  - Cart (icon);

- *To provide additional information about Heinz company and website* → Footer. The footer has to contain the following information:

  - Copyright statement;
  - Terms & Conditions;
  - Privacy Policy;
  - Heinz logo;
  - Links to social networks;
  - Contacts (mainly important for the Shop).

The informative apparatus of each of the sections just mentioned is thoroughly defined below:

1. Ancillary Site Homepage: this section is intended to be the connective point between Heinz and our website. Within the navbar of Heinz website there will be an item which links to this page. The Ancillary Site Homepage is the starting point of the interaction. It has to be clear and simple. It also has to give users all the basic information that is needed to start approaching the application. The requirements the homepage has to satisfy are:

   a. *To give a clear vision of what the user will find in the website and especially in the customization application* → Main content

      i. Show the name and claim of the application;
      ii. Provide exhaustive starting information about the application without being verbose. The objective is to give users the idea of what they are going to experience, possibly without taking away anything from engagement and surprise;
      iii. Highlight clearly where the user can start the sauces' customization process. This is the fundamental info of homepage. "Start" information

will open a new tab where the user will actually start the experience of extreme customization.

2. "Crea la tua salsa": as mentioned above, this website's section is the core part of our work and also the more articulated one. This part has to satisfy all users' tasks specified in Section 3.1. This section's main informative apparatus has to lead users to the final customized product and assist their choices. More specifically, when the user makes a decision and operates an action, the action also triggers a series of other functions that partake in the whole customization process. The requirements the *Customization Part* has to satisfy are:

a. *To choose each part of the customizable product* → Customization. It is made by the following steps:

i. Sauce Customization: for each of the following points, users need to be explicitly guided to help them understand what they are doing and what kind of choices they are suppose to make. Sauce Customization is made up of the following:

1. Guidance through the management of the following information:
    a. sauce type;
    b. sauces ingredients. Some information has to be necessarily provided, such as:
        i. Fundamental ingredients (i.e. Ketchup necessarily requires tomatoes, vinegar, salt and sugar);
        ii. Additional ingredients, not required by the traditional recipe;
        iii. Ingredients provenance, characteristics and Heinz policy on that specific product.
    c. sauce consistency;
2. Summarization through a pie chart representing the ingredients added by the user as their percentage with respect to the whole sauce.

3. *To show how the recipe is made and where the ingredients needs to be positioned* → Preparation Process. It is aimed to clearly show choices' results and information about the preparation process. It also serves as a summary of what the user has done so far and as a repository of the chosen ingredients.

4. A clear signal that the sauce's customization is finished.

ii. Package customization: users need to be explicitly guided to help them understand what they are doing and what kind of choices they are suppose to make with respect to the design of the package. Package Customization is made up of the following:

1. Guidance through the management of the following information:

    a. Package's size;
    b. Package material;
    c. Related info on materials (e.g. glass for environmental issues).

2. A clear signal that the package's customization is finished.

iii. Label Customization: users need to be explicitly guided to help them understand what they are doing and what kind of choices they are supposed to make with respect to the design of the label. Label Customization is made up of the following:

1. Guidance through the management of the following information:

    a. Possibility to change it or leave it as a standardized Heinz label;
    b. Choice among a series of thematically varied templates;
    c. Colour palettes;
    d. Textual content.

2. A clear signal that the label's customization is finished.

In each of these sections there is the possibility to skip in order to reach the next step (i.e. skip sauce customization to only customize the label), so it has to be clearly indicated.

b. *To show some tips and trivia about the product* → Tips and Trivia. This part is highly connected with the *Decisional Process:* each decision/action triggers an system reaction in this section. It is aimed to clearly show:

i. Ingredients' characteristics and information, such as:

1. Where its ingredients come from;
2. How the recipe is obtained;
3. Suggestions and advices on the sauce preparation;
4. Fun facts;

ii. Instruction about the interaction, such as:

1. Feedback on actions;
2. Suggestions on how to proceed in the customization.

This happens during the entire process, but it is also aimed to work in the loading times.

3. Cart: this section is intended to be the function that allows the user to get the Extreme Customization results. This means that this part comes after the *Customization Part,* allowing users to get the final result of the process. The requirements of the *Purchasing* section has to satisfy are:

a. *To provide the possibility to choose to buy one or more products*;
b. *To effectively buy the product(s)*;
c. *To guarantee a safe online payment*;
d. *To give the user a recipe of the sauce they created* → Final recipe. It is a downloadable/printable PDF document which reports the final choices done by users during the *Sauce Customization* process. Note that the system allows to download the recipe only after the purchase of each product.
e. *To allow the start of a new customization.*

4. "Contatti": this section provides the most important information about the organization, its contacts, whereabouts and other additional information. This means that users can find it useful for:

a. Dealing with problems they encountered while using the system;
b. Dealing with problems with the products they created;
c. Dealing with problems with the shipping of the product;
d. Getting more information about the company, the customization service, the products, etc.
e. Contact the company to solve another issues.

It is important to stress about the fact that the information has to be clear, authentic and transparent, in conformity with the users' expectation of a heightened level of transparency on the website and in every interaction they may have with the organization. People favor companies that showcase themselves as being customer-focused, human, and easy to understand.

4.2 CAO=S Model

As previously described, the design proposal consists of the creation of a subsite of the general Heinz website that allows the creation of customized sauces. During the designing phase of the subsite at issue, the CAO=S model has been used as a basis for the design proposal. The CAO=S model (Concepts, Actors, Operations generate

Structures) is a draft model that allows to adopt a goal-oriented design approach in economically constrained projects. It represents a simplified version of the traditional Goal-oriented design model. It reduces the analysis of the users to the only features that have an important impact on the interaction and without an accurate analysis of the personal goals of the users. In this way, it allows a good quality development team without specific experience in the field of usability to avoid at least the most frequent errors in designing usable applications.

The CAO=S model is based on the study of the information types (Concepts) that the application must manipulate on behalf of the user types (Actors) by providing commands (Operations). A correct analysis of these allows to generate the three types of Structures managed by the model:

1. Views, which are display screens of properties of the concepts;
2. Data Structures, which are patterns for the persistent storage of concepts' properties;
3. Navigation, which consists in mechanisms for navigating from one view to another.

The solutions that CAO=S uses to increase the usability of applications are acting on features such as expected utility, completeness of content, the comprehensibility of the vocabulary (eliminating the terms of difficult interpretation). An important change made in this design model is to make the phase of user analysis, tasks and goals a project a parameter instead of a design requirement.

CONCEPTS - Concepts are the way in which the user perceives and understands the information regardless of whether and how it is stored in the data structures. They are obtained from the analysis of the raw requirements collected in the domain. Since the concepts correspond to nouns and adjectives (and not verbs), they can also include ambiguity in the definition of information and for this reason they have to be normalized in order to provide concepts expressed in the user's language. The problems associated with the concepts are:

1. *Standardization problems* - Lexical choices of direct actors always have priority over those of the design team of any indirect actors. This is why we will adapt them to those of real users and we will not use numeric codes, abbreviations, acronyms, unless they are commonly used by users.

2. *Lexical differences* - Since actors and team may use different words to express the same thing or direct and indirect actors may use the same word to express the same thing, we will find terms acceptable to all (even when preferred by none). In addition, we will clarify the relationship between the term chosen and

all other terms, above all using tooltips. In general, we will prefer to use the terms used by users with a lesser domain competence.

3. *Conceptual differences* - we speak of a conceptual difference when the same word is used by different actors to describe different things. In this case, we will never use the word at issue, but specifications and clarifications to disambiguate the concept.

4. *Polysemies* - In this case, the same word is used by the same actors to describe different things. To solve this problem, we will never use a polysemic word, but we will find acceptable synonyms for each different meaning.

The lexicon related to the domain of sauces should not be particularly ambiguous, however care will be taken to achieve a certain lexical clarity. In all the cases, no unilateral decision will be made without checking with the actors.

ACTORS - The actors are the categories of users that act on the application interfaces to perform their tasks by manipulating the data structures perceived through concepts. They are differentiated not for their own characteristics, but for the role they play within the application. Unlike of the characters used in Goal-oriented models, the actors are described through the essential features that have a direct impact on interaction. They correspond to competences and abilities of exactly six basic users' characteristics. For each feature, we assign a numerical score from 1 to 5, where 1 corresponds to a very low value and 5 to a very high value. The features at issue are:

1. *Technical competence* - It indicates mastery of the technical vocabulary, the use of applications and the use of the relevant devices. Nowadays, no longer one-dimensional, given the complexity of today's technology from PCs to tablets, and so on.
2. *Domain competence* - Knowledge of practices, terminology, subtleties on the subject of the system.
3. *Language competence* - Knowledge of the language of the system and the ability to understand the different communication registers.
4. *Physical ability* - Physical limitation, even partial and/or temporary, reducing the ability to use the device the system is running on.
5. *Motivation* - Motivations that cause the user to be interested in a task, to use the system at issue for the task (lower if use of the system is not a priority for the user's goals, or if he is required to use it, or if the tool is technically but not conceptually functional to a goal).
6. *Concentration* (environmental distraction) - Ability/possibility to provide adequate focus on the task.

Each character is associated with a C&A diagram. Each character has a score for each category. The total area represents the target user. Outside the area, there are no target users. At the center, there are people with high skills and abilities and vice versa at the edges. An interesting persona is a borderline character.

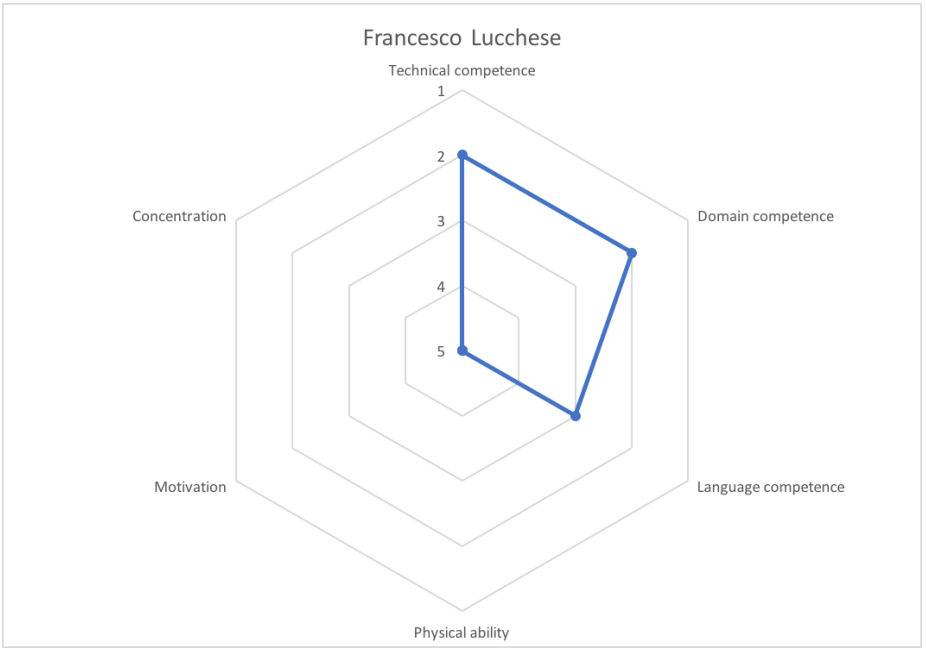

Image 20. *Francesco Lucchese*'s values.

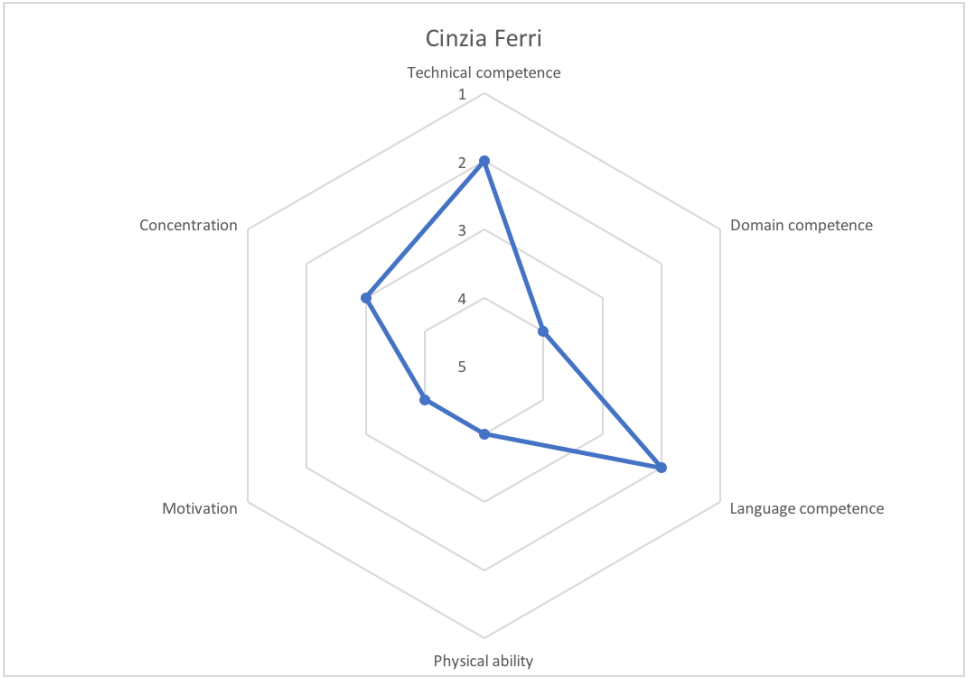

Image 21. *Cinzia Ferri's* values.

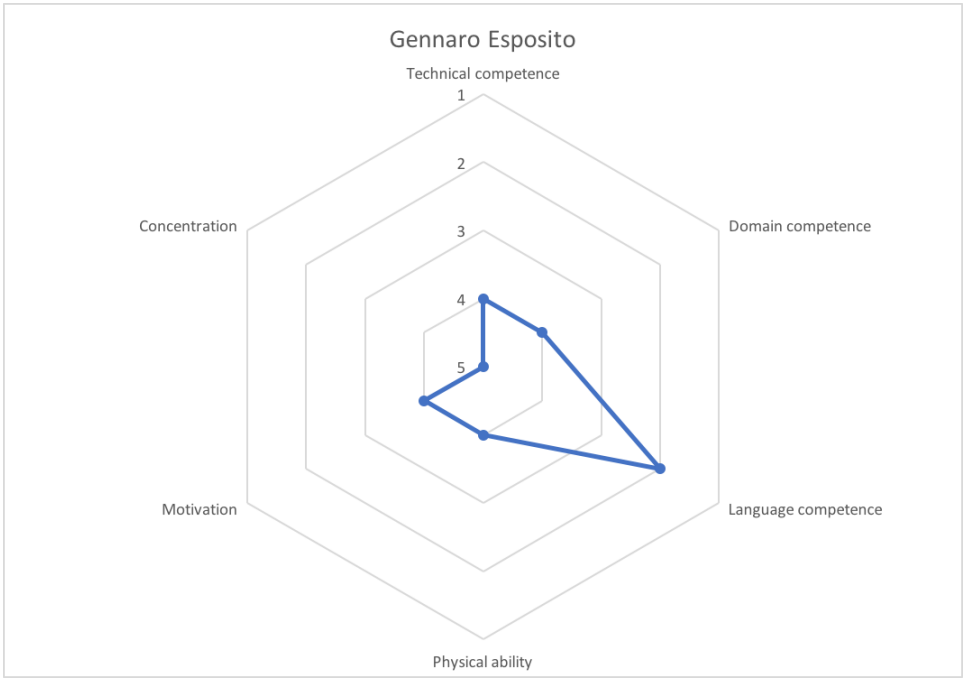

Image 22. *Gennaro Esposito's* values.

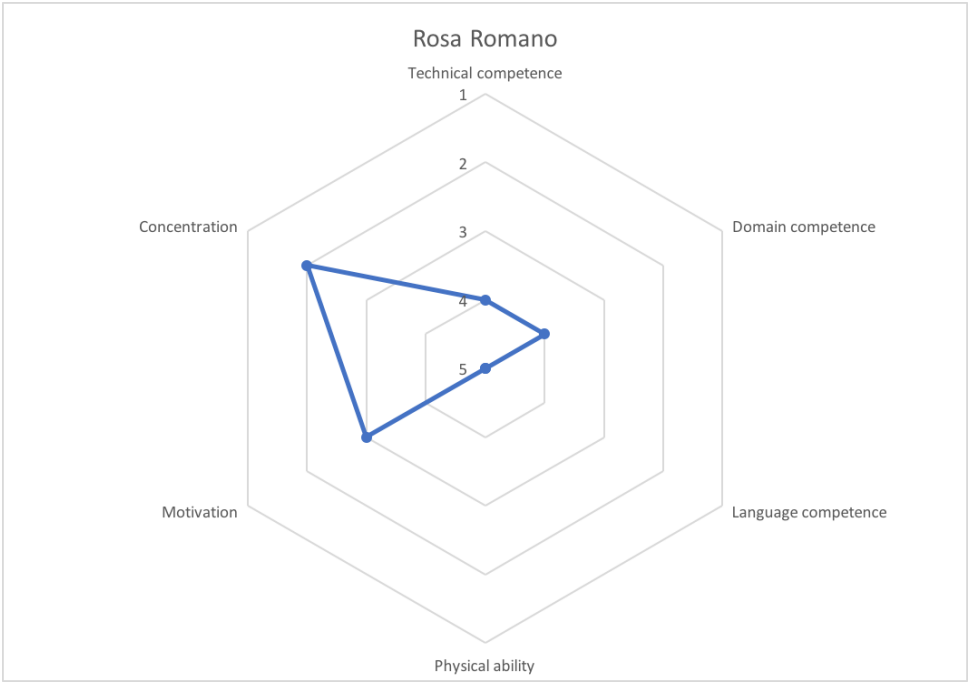

Image 23. *Rosa Romano's* values.

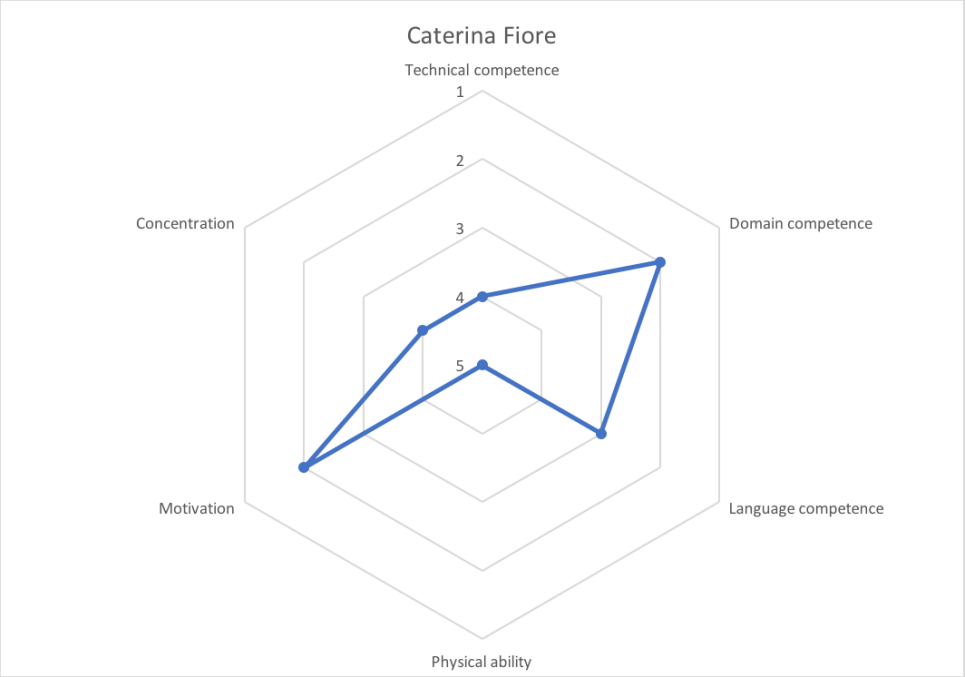

Image 24. *Caterina Fiore's* values.

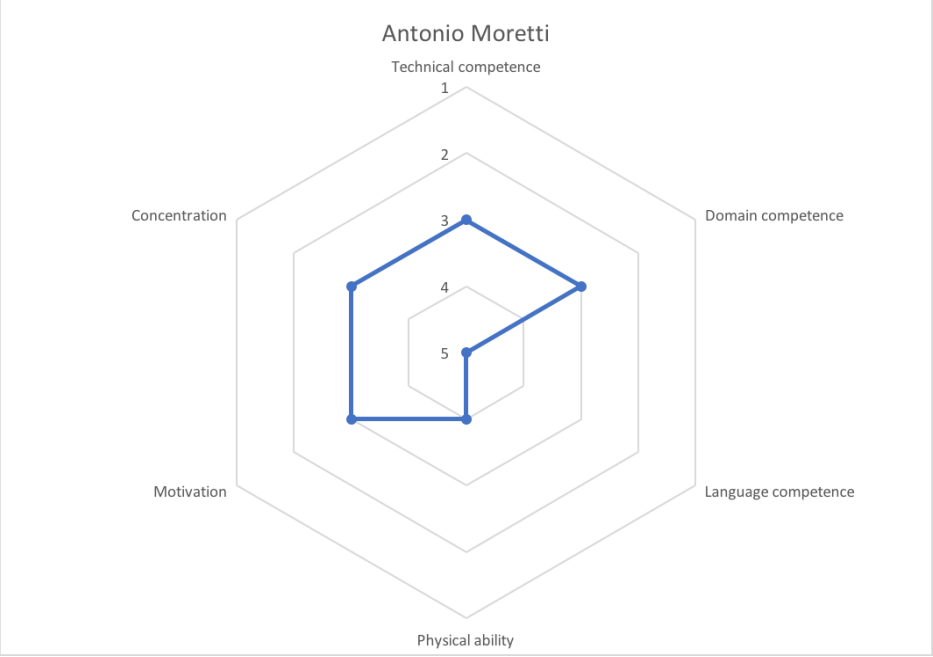

Image 25. *Antonio Moretti's* values.

- Technical competence - Since it is high, the interface should be essential, without much in the ways of explanations, standard (external consistency).

- Domain competence - Since the level is high, the interface should be essential, with little explanations, passive, flexible on the execution sequence of commands.

- Language competence - Since it is low, the interface must use simple sentences, short, without subordinate, possibly lists.

- Physical ability - Since it is high, the interface can be dense and compact, and color scheme can be anything.

- Motivation - Since it is high, the interface can be minimal, reflecting just the functions of the application, allowing choices and custom paths.

- Concentration - The users' concentration is high, so we can make the interface denser and rich in stimuli and suggestions.

OPERATIONS - The operations are the manipulations performed by the actors on the concepts accomplished updating the data structure in the system. It is important that every command, label, widget includes terms associated with the concepts, and not with the terms of the associated system. For example, clicking on the button under the name of a specific ingredient, a tooltip will be displayed. It contains further information on the ingredient at issue. The button will not be called "tooltip" or "button", but it will be called "More info".

Every operation acts either on one or more instances of the concept, directly or indirectly, in definitive or temporary manner. The operations according to CAO=S are of four types. In our case, they are organized around a CRUD-like characterization:

1. *Create* - It consists in the generation of one or more instances of concept in the initial state. About the creation:

    - Types - Our creation will be manual. The user will be able to create her own sauce manually, selecting step by step all the ingredients and packaging.
    - Default - The initial state will never be empty of values, since the default values are fundamental to reduce the user work and reassure her about the meaning and the destination of the operation. For example, in our application the can decide to create her personal ketchup. For making ketchup, she has to choose at least one type of tomato mandatorily, so a tomato type will necessarily appear selected by default.

    - Multiplicity - It is possible to create only one instance at the same time.

    - Persistence - The instance of this concept is transient and related to the mere execution of the operation. Once the sauce is create, it is not

persistent in the website, since no login is available (remembering that the delivery of the product can be followed from the user's e-mail).

- User memory - In additional to the default value proposed by the system, we will not suggest values previously entered by the user, even if they are useful for the rapid and efficient creation of many similar instances of the concept. This because no login is available for now.

- Failure notification - Failure notifications will not appear at the end, but when the system encounters a problem. For example, the system allows to upload your personal label for your customized bottle of sauce. If the system does not support the upload of that kind of format, it is suddenly notificated.

2. *Read* - One or more instances of the concept are displayed in an understandable way. There are different types of views:

    - Full individual - All properties are associated with the concept are visible. An instance of this operation is when at the beginning of the customization the user is asked to choose what sauce to act on.

    - Individual reduced - Only a few fundamental properties are identified and displayed and it is possible to switch to a complete individual view. This type of view will be used in the case too many templates to customize the label have to be shown. If there are too many templates, only a part will be shown. To visualize the others, you have to click on ">" button.

    - Multiple (list) - A reduced view of each item of the list is provided. It is possible to switch to an individual view and to perform operations on the list, as sorts, groupings, filters, database searches, and so on. "Pimp my Heinz" does not include instances of this operation.

    - Multiple (lookup) - It is possible to select one or more instances of the concept for later use. It could be an extremely reduced individual view. If there are many instances, it can be possible to sort, group and filter. "Pimp my Heinz" does not include instances of this operation.

    - Multiple (summary) - Facts are grouped by concept and are displayed together. The ingredients are grouped accordingly to their characteristics and displayed together.

3. *Update* - It is the modification of one or more properties of one or more instances of the entity, without creating new ones. The operation of updating will be global, so all the properties of the instance are modifiable.

4. *Delete* - It consists in the removal of one or more entities from the system or from the attention of the user. In our case the removal will be an elimination: the instance/instances will exist no longer and are no longer recoverable.
   The notification of success or failure will be managed. Before the final deletion, the user will be notified and a confirmation will be requested.

They do not correspond to system functions, but to tasks that are interesting for the actors on the concepts, accomplished through the system.

STRUCTURES - In CAO=S model, the structures are:

1. *Data Structures* - The normalization of concepts generates persistent storage models of entity (DBMS).

2. *Views* - Models of screen through which the properties of entities are displayed. Each view is composed of actual visualization, commands that can be activated during viewing and dome of these commands are navigation-related.

3. *Navigation* - mechanism to activate view and commands to switch from a view to the next.

Given this data, we have created a three-dimensional table according the CAO=S model. On the axis we have put the concepts, the actors and operations. Inside the cells, we have annotated how the actor A should be able to perform the operation O on the concept C. The diagram shows the views that collect different cells that are coherent with each other for purpose and constraints and that therefore allow the operations specified on the specified concept by the specified actors.

USER	CUSTOMIZABLE SAUCE
CREATE	The user can only create one sauce at a time. The user will be asked to select her favorite ingredients from predefined lists of ingredients, divided into categories. The user will have to do a drag and drop of each ingredient in a machine that makes sauces, until she feels satisfied with the chosen ingredients. This process has the typical characteristics

	of a videogame. After finishing the preparation of the sauce, the user can choose a personalized bottle material and label for her own bottle.
READ	At the beginning of the customization the user is asked to choose what sauce to act on. Then, she can choose ingredients and different styles for the label. In the case there are too many ingredients, you have to scroll them. In the case too many templates to customize the label have to be shown, only a part will be shown. To visualize the others, you have to click on ">" button.
UPDATE	The user can change the features of the product at any time before the actual purchase. She can change the ingredients and label whenever she wants before making the purchase. After purchasing, it is not possible.
REMOVE	The user can eliminate any ingredient at any time before the actual purchase. In some cases, if the ingredient is mandatory in the recipe, she will have to replace the ingredient eliminated with a new ingredient of the same type (e.g. to create a ketchup base sauce, it will be mandatory to insert the tomato in the customized sauce. The user decide which type of tomato to use - ciliegino, datterino, San Marzano, etc. - and can change the type of tomato until the actual purchase, but she cannot completely eliminate this ingredient, that is to create a ketchup without tomato). The same in the case of label. The label can be eliminated whenever the user wants, but it is mandatory to set a label, otherwise the purchase will be not possible.

Table 8. CAO=S model Structures.

Having all the views, we will design the navigation, and so the access to the various parts, the disambiguation pages and sorting. Finally, we will design the data structures in order to satisfy in the most simple and correct manner the constraints of view and navigation.

4.3 Interaction Design

Interaction Design is a process in which designers focus on creating engaging interfaces with logical behaviors and actions. Interaction Design means defining system behaviors to answer the following question: "*How does a user take the action they want?*". In other words, Interaction Design is about the way users interact with the interface and how they complete their goals. In order to do this, it is necessary to define elements such as graphics (menus, buttons, etc…) and their manipulations (animations, interactive components, etc…).

"Pimp my Heinz" website is organized in four primary sections:

- Homepage
- Customisation Process ("Crea la tua Salsa")
- Chart ("Carrello")
- Contacts ("Contatti")

The navbar and the footer, both in graphics and functions remain the same as in the "Heinz" website.

More specifically:

- Homepage:

    - *How will the user reach our website?*

        - Path 1: The user enters the website directly (search engines, direct link on social media) → "Pimp my Heinz" homepage opens.
        - Path 2: The user enters through "Heinz" main website → She clicks on "Pimp my Heinz" on main navigation, entering "Pimp my Heinz" homepage. Then, by clicking on "Inizia!" button, another tab opens where the customization process takes place;
        - Handling errors: the two paths have been designed to handle errors (i.e. misplaced clicks, avoid time consuming navigation).

    - *How can the user interact with the homepage contents?*
        - Read the textual content and familiarize with the graphics via visual content (carousel with GIFs or static images showing main steps of the "Crea la tua Salsa");
        - Shift the carousel slides;
        - Click on Navbar sections to navigate primary navigation contents;
        - Click on Footer elements to have further information on "Heinz".

- *How can the user start the customisation process?*
    - Click on "Inizia" button in homepage to start the customization process;
    - Click on "Crea la tua Salsa" section in primary navigation to start customization process.

- Crea la tua salsa: the customization process involves a series of manipulations, including either animations and interactive components. The conceptual and graphical setting, together with components, subcomponents and possible interactions are following described.

  The overall conceptual models underlying the interaction is so structured:

  - *Which are the metaphors, retraced from the real-world, used in order to facilitate actions of the customization process in a consistent way?*

    - Kitchen Drawers: the available additional ingredients (i.e. spices, chillies, extra flavours) for preparing the sauce are arranged in a shelf and the user can pick them up, mimicking the action of selecting ingredients in a tangible kitchen. At the beginning the drawers are closed, after selecting all the mandatory ingredients, they automatically open.

    - Kitchen Board: in the kitchen there is Tom Atoes, the expert assistant who provides tips and trivia in a speech bubble. The assistant has been conceived to satisfy the informative part of the customization process and also to assist the user in the interaction with the system.

    - Glass Pipeline: in the glass pipeline there are the ingredients picked by the user. On the pipeline there will at least as many slots as the mandatory ingredients and at most as many empty slots as potentially all the ingredients on the shelf. Additionally, at the end of the editing, the sauce will flow through the length of the pipe until it reaches a funnel at the end. Underneath the funnel there is an empty bottle, placed on a kitchen table, that will fill up with the sauce during the charging time. It represents the "industrial" part of the process that is enclosed by the other two metaphors that are related to "homemade" cooking.

    - Dynamic Pie Chart: the chart is aimed to summarise the chosen ingredients and their related quantities. Next to the pie chart, there are as many slidebars as many ingredients the user has selected in the pipe. Moving the marker in each bar, the percentages of ingredients change in the chart in order to obtain the desired quantities.

  - *What are the metaphors in the purchasing process?*

    - Cart: the shopping system consists in the addition of user-customized products that get added to a cart, a space for users to store items for

later purchase. The metaphor of the cart has been chosen as it is well-know for online shopping and as it provides the user with the idea that putting an item in the cart does not necessarily mean that they are buying it, allowing the customization of further products before checking out.

- *What manipulations are provided in choice of sauce?*
    - The user can only click on the chosen sauce to start the editing process.

- *What manipulations are provided in the customization process?*

    - "Heinz" homepage is reachable by Heinz logo on navbar;
    - "Pimp my Heinz" is reachable clicking "Homepage" section in primary navigation on the navbar;
    - The other sections of the navbar are available in this screenful and during all the manipulations;
    - The user can skip by clicking on a button to jump to the further customization phase in case she is not interested in exploiting the whole customizability;
    - When the user selects or hovers on an ingredient, its name is shown;
    - Mandatory ingredients are fixed on the pipeline, by clicking on them, the system will show all the possible varieties for that ingredient (it triggers also info about them from Tom). Once a variety is chosen, the user can click or drag it in the middle circle. This action is reversible;
    - Once the additional ingredient has been chosen, the user drags it from the drawer and drops it in its reserved space located in the glass pipeline. This action is reversible;
    - If the user choose not to use an already selected ingredient, she can put it in the bin;
    - Every time the user drops an ingredient in the pipeline, her action triggers a tip from Tom;
    - When the user finishes the available space in the pipeline, other slots will appear by scrolling down the pipeline's section;
    - By clicking on a button to choose the quantities of the ingredients, a modal will be shown.
    - In the modal the user can interact with the bars (mentioned before), which triggers some changes in the pie chart (not interactive);
    - Every time the user drops an ingredient in the pipeline, the pie charts slices and relative percentages change accordingly. The user can see this changes only by reaching the modal.
    - The user informs the system that they are done with the customization process of the sauce by clicking on "Customizza l'etichetta", so that they can go on with the next step.
    - By using the lateral menu, the user can jump from a section to another (step 1, step 2, step 3)

- The user can use the “Customizza la bottiglia” only after choosing all the mandatory ingredients. If she has not selected the mandatory ingredients yet, the button is disabled.

- *Which are the possible interactions between our package customization interface and the user?*

  - The user can click on “Customizza l’etichetta” to skip the current section and jump to the next one;
  - Underneath the glass pipeline, a default bottle (with Heinz standard label), the user can choose the material of the package they prefer by selecting the respective bottle in a section showing all the available materials.
  - In the center of the webpage the user can look at graphical representation of the chosen bottle’s material (i.e. glass or plastic);
  - The central preview of the bottle material can be turned by clicking on the arrows button or by dragging (sliding with the mouse).
  - The user can manipulate the size of the bottle by interacting with the slider bar below the bottle. The steps (representing available sizes) are fixed (14, 32, 64, 114 oz)
  - Every time the user hovers on an option, her action triggers some info from Tom about that material.
  - Every time the user hovers on an option the preview is highlighted.
  - By using the lateral menu, the user can jump from a section to another (step 1, step 2, step 3)

- *Which are the possible interactions between our label customization interface and the user?*

  - The user can click on “Ho finito!” button and jump to finish her editing process;
  - The user can choose the overall style of the label by selecting a template among a set of available presets. Each of them is characterized by a distinctive style and feel, in order to be adaptable to many different situations (i.e. homemade style, ‘80-cyberpunk style, etc...);
  - Each template has 5 color palettes. The user can choose one of the showed palettes
  - The user can add customized textual content that can be entered in a text box;
  - The user can change the text’s font style;
  - The user can complete the process and finalize the product by clicking on “Ho finito!” button.
  - By using the lateral menu, the user can jump from a section to another (step 1, step 2, step 3)

- *Which are the possible interactions between the buffering time and the user?*
    - Here the user can look at the buffering process animations
    - The user can also read Tom's tips and advices

- Cart:

    - *How will the user buy the product?*

        - After the completion of the customization process, the user is directed by the system to the shop section of the site to buy the product they just created;
        - When the user first arrive in the cart section, the system will ask if she wants to customise another sauce, if yes, she can start another customisation process;
        - The user adds the necessary information to complete the transaction in an adequately structured form;
        - The user can create multiple sauces. In the contextual navigation, a box in which we find some cards of the customizable sauces is available. For each card, there is a "Modifica" button. Clicking on it, the user is redirected to "Crea la tua salsa page". The system will store the sauces the user has already created, but only until the user closes the website;
        - After purchasing, the user can click on a download button for each purchased Heinz bottle. The output is a PDF of the recipe of the purchased sauces.

- Contacts: It is a static, simple page. Its design has to reflect the nature of information (clear, authentic and transparent): no highly interactive mechanisms are thought for this section because of its informative nature.
    - The user can interact with a map (with Heinz address);
    - The user can send an email by means of specific forms.
    - The user can read practical information about Heinz headquarters.

4.4 Structure Blueprint

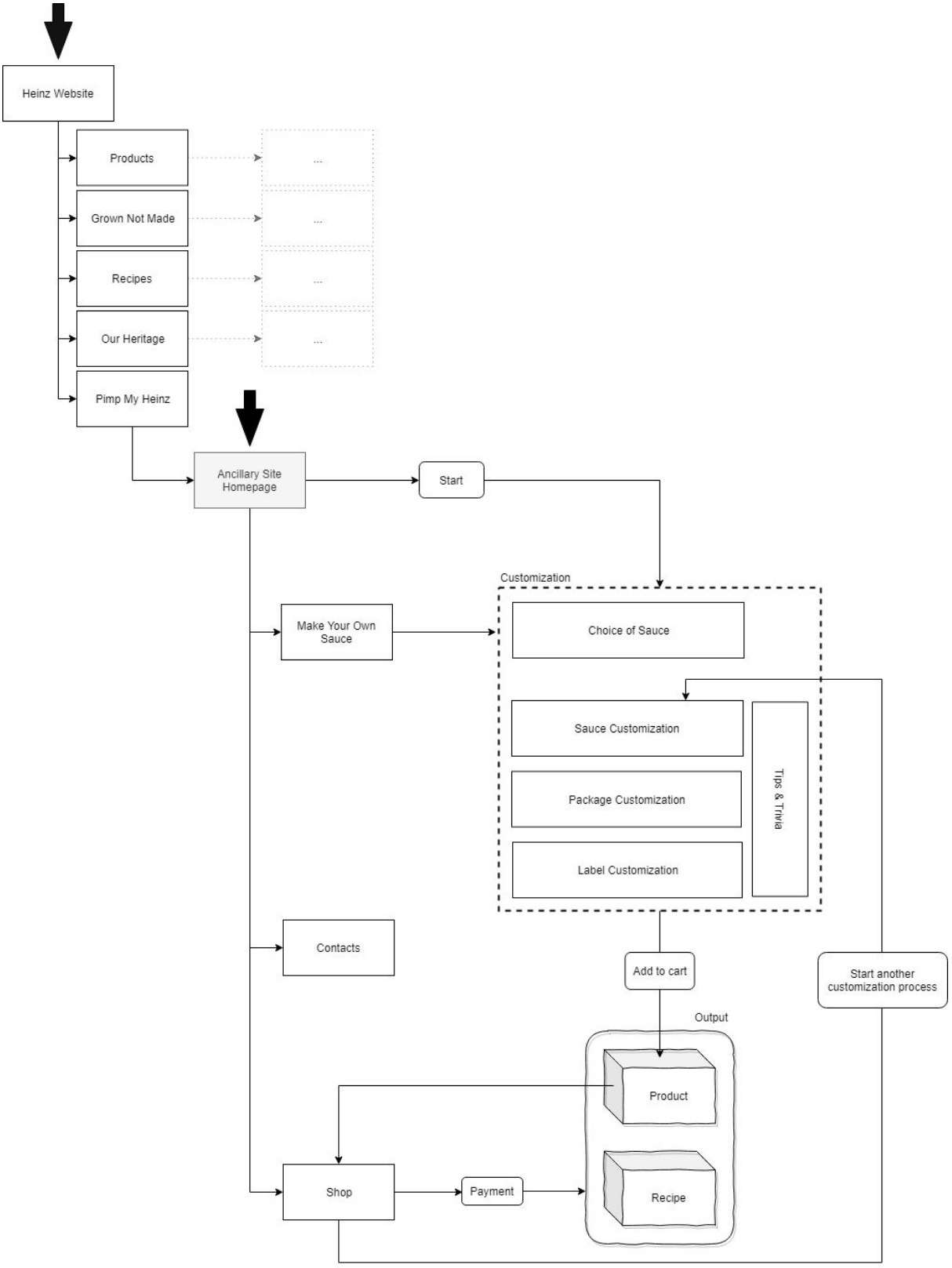

Figure 26. Information Architecture of Pimp My Heinz.

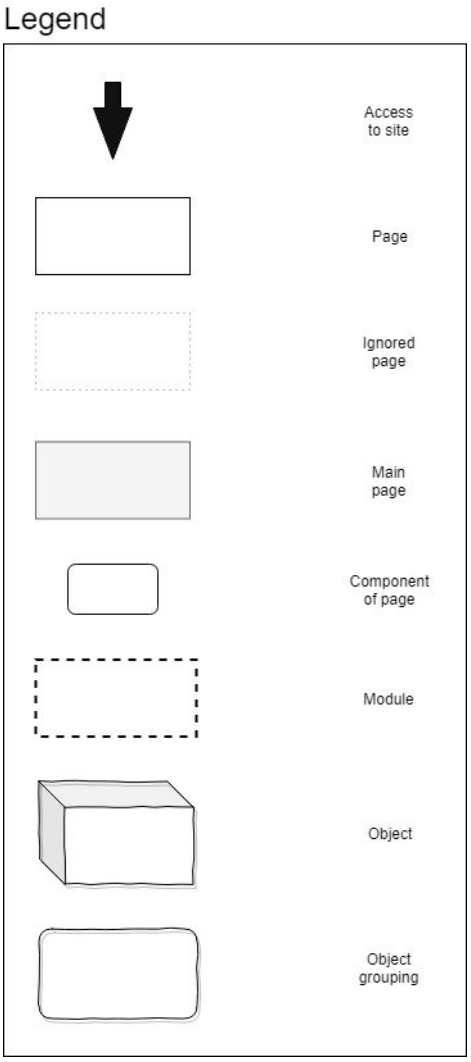

Figure 27. Legend of the Information Architecture of Pimp My Heinz.

Figure 26 shows the blueprint, which defines the content components and how these components are connected with each other. In the case of the application presented here, a low-level granularity of representation has been chosen in order to make it clearer with respect to its information structure.

4.5 Wireframes

A wireframe is a low-fidelity, simplified outline of a product. It is useful for creating the backbone of the entire project layout, making it easier to later build individual parts. Its simplicity is forgiving of mistakes and allows to experiment, which takes some of the hassle out of designing the overall structure. It also characterizes a wireframe for what ultimately is: a means to the final prototype. It just helps to focus the overall placement and organization of content for the prototype.

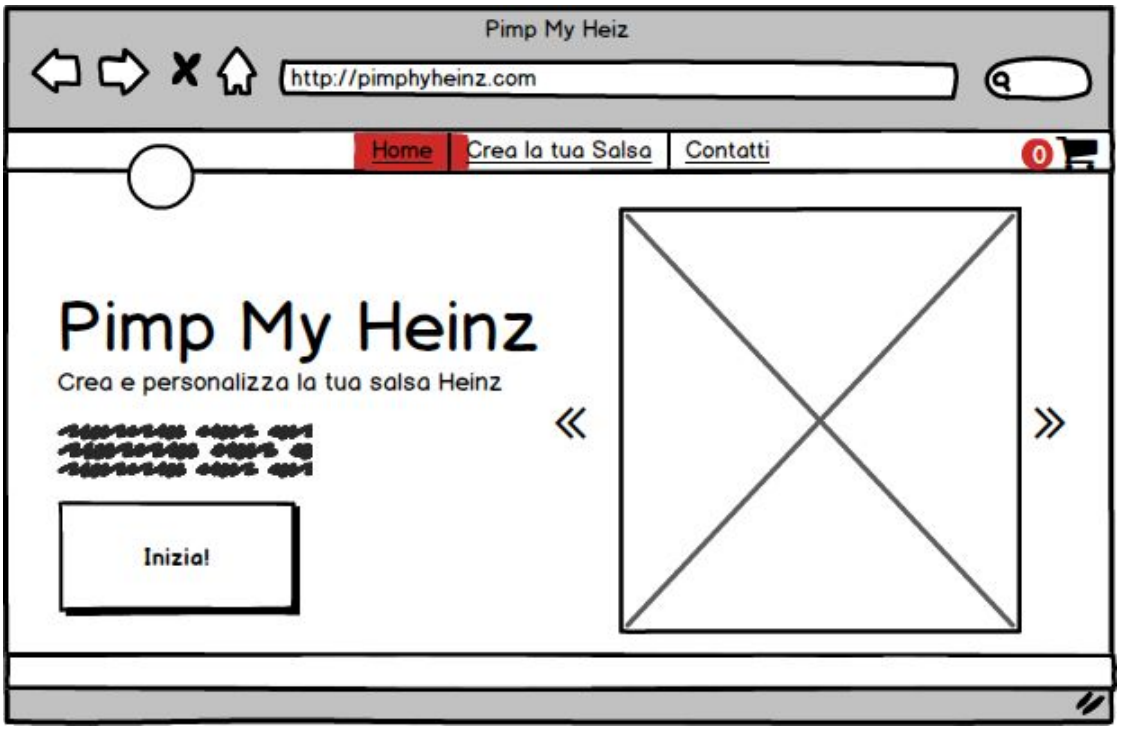

Figure 26. Ancillary Site *Homepage*'s Mockup Mockup

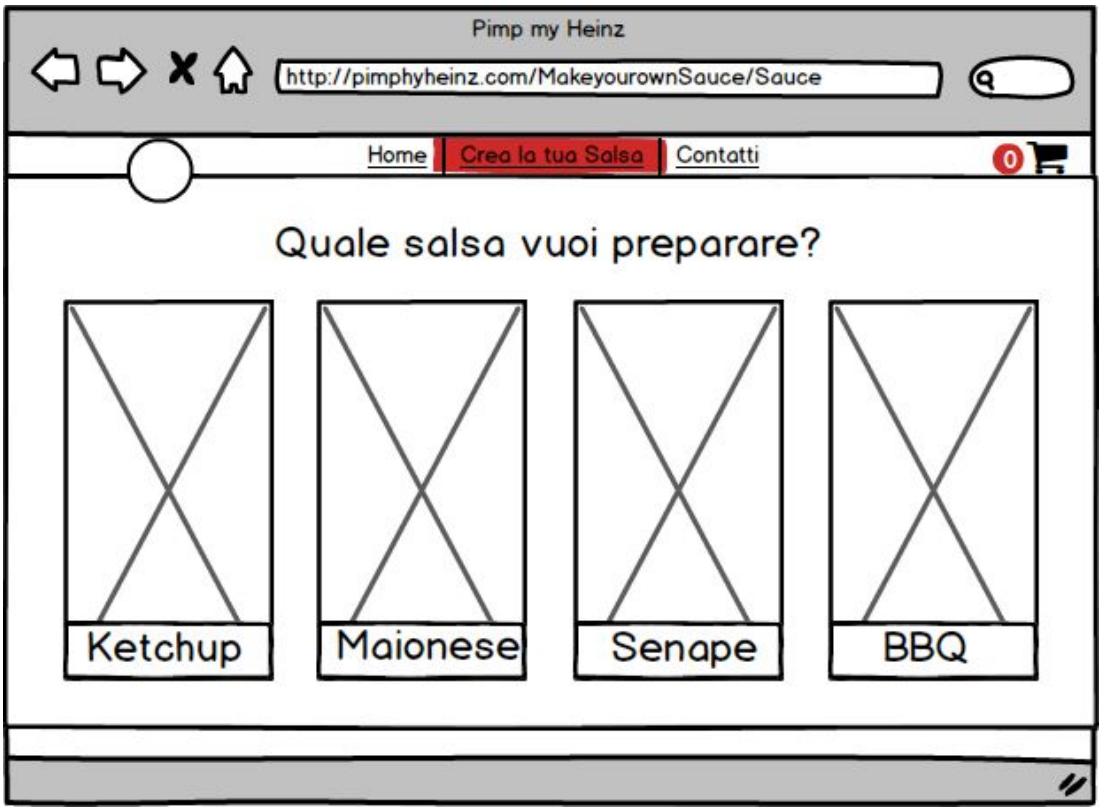

Figure 27. *Crea la tua Salsa* ⟶ Subsection 1: Choice of the sauce Mockup

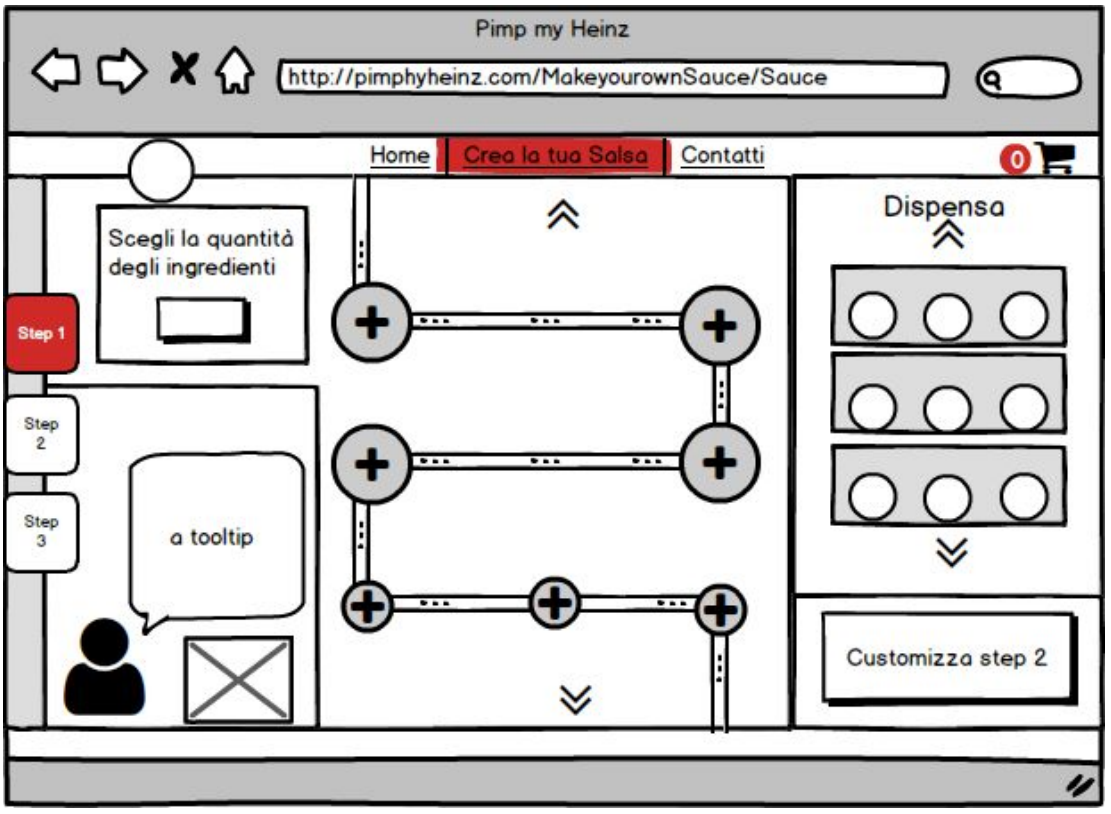

Figure 28. *Crea la tua Salsa* → Subsection 2: Preparation of the sauce Mockup

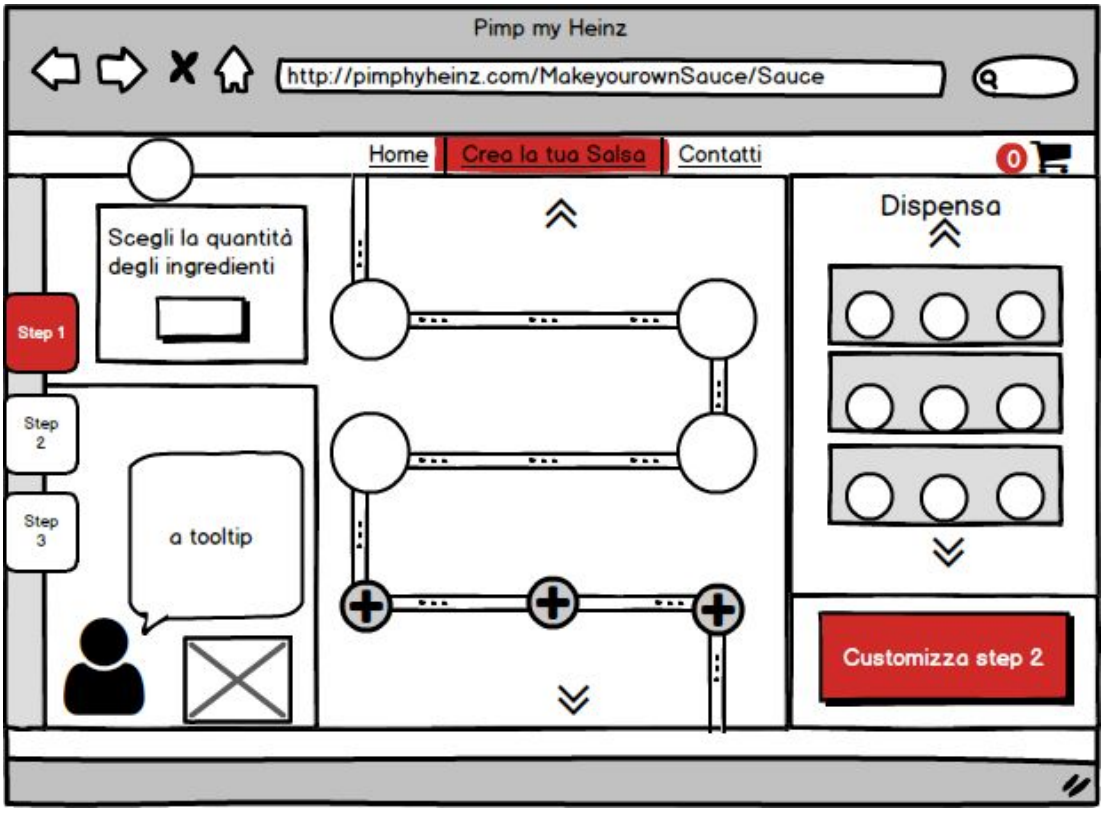

Figure 29. *Crea la tua Salsa* → Subsection 2: Preparation of the sauce Mockup

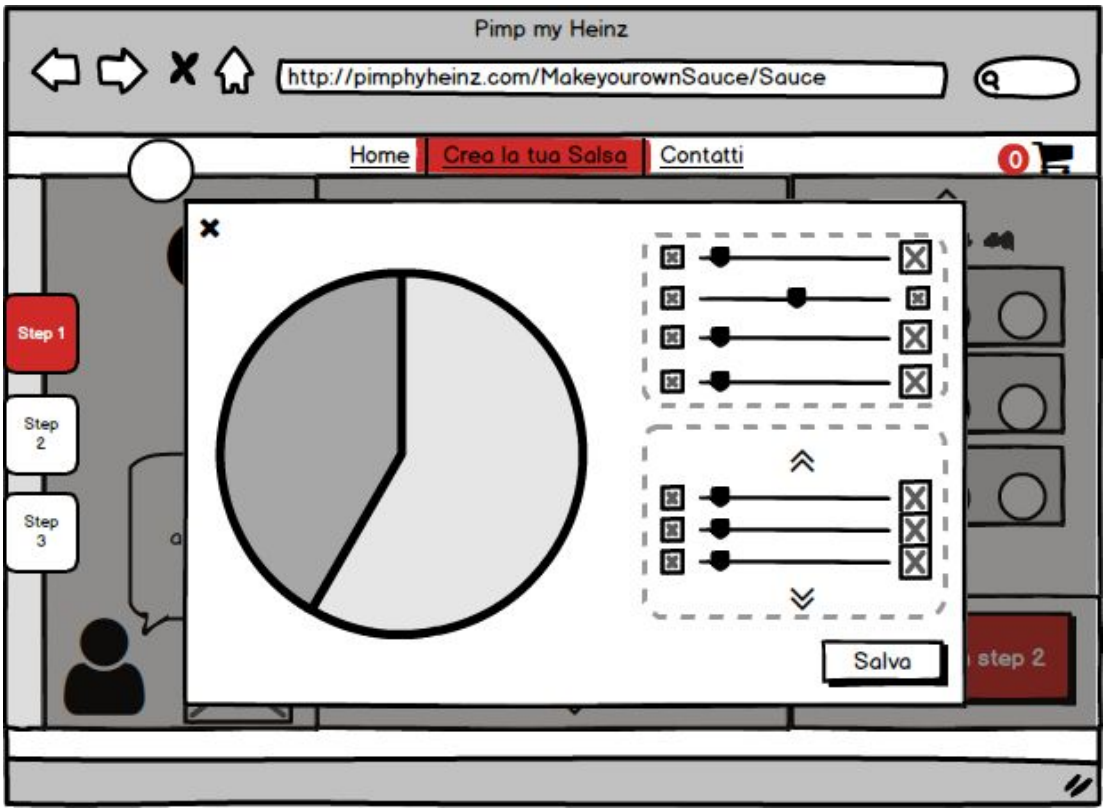

Figure 30. *Crea la tua Salsa* → Subsection 2: Preparation of the sauce → The mockup represents the modal opened when user wants to adjust ingredients' quantity

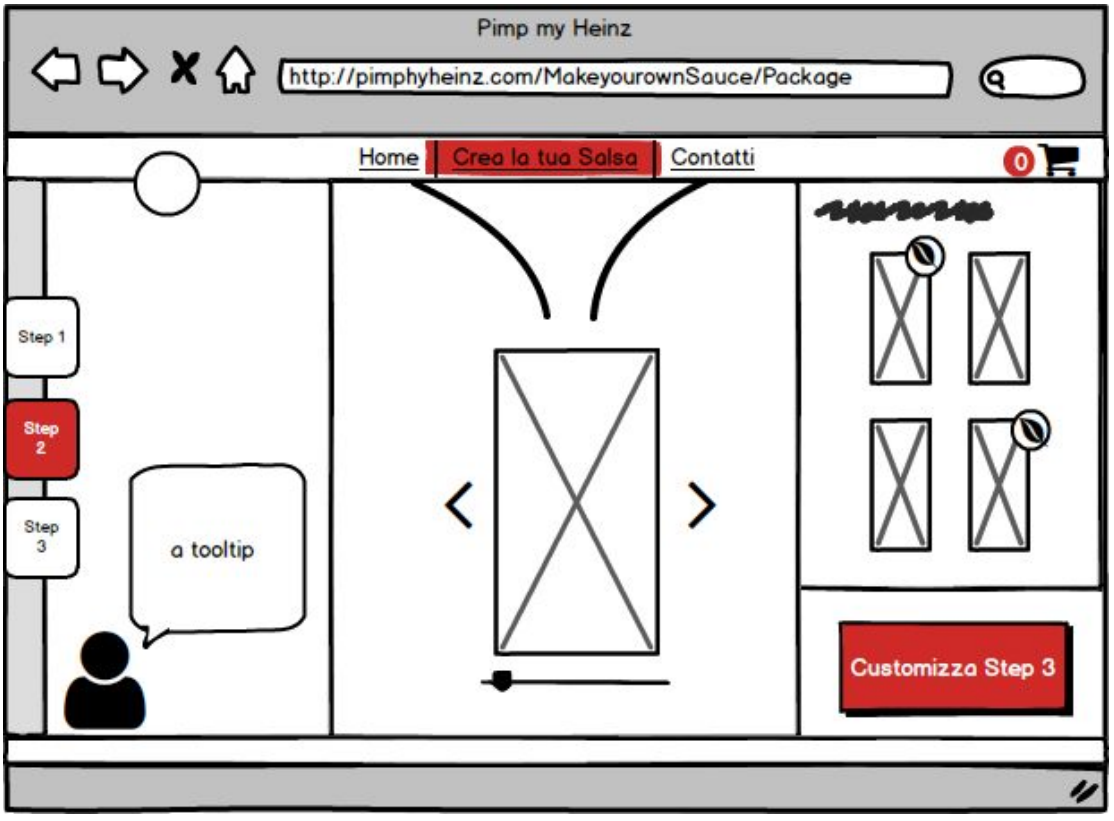

Figure 31. *Crea la tua salsa* → Subsection 3: Package Customization Mockup

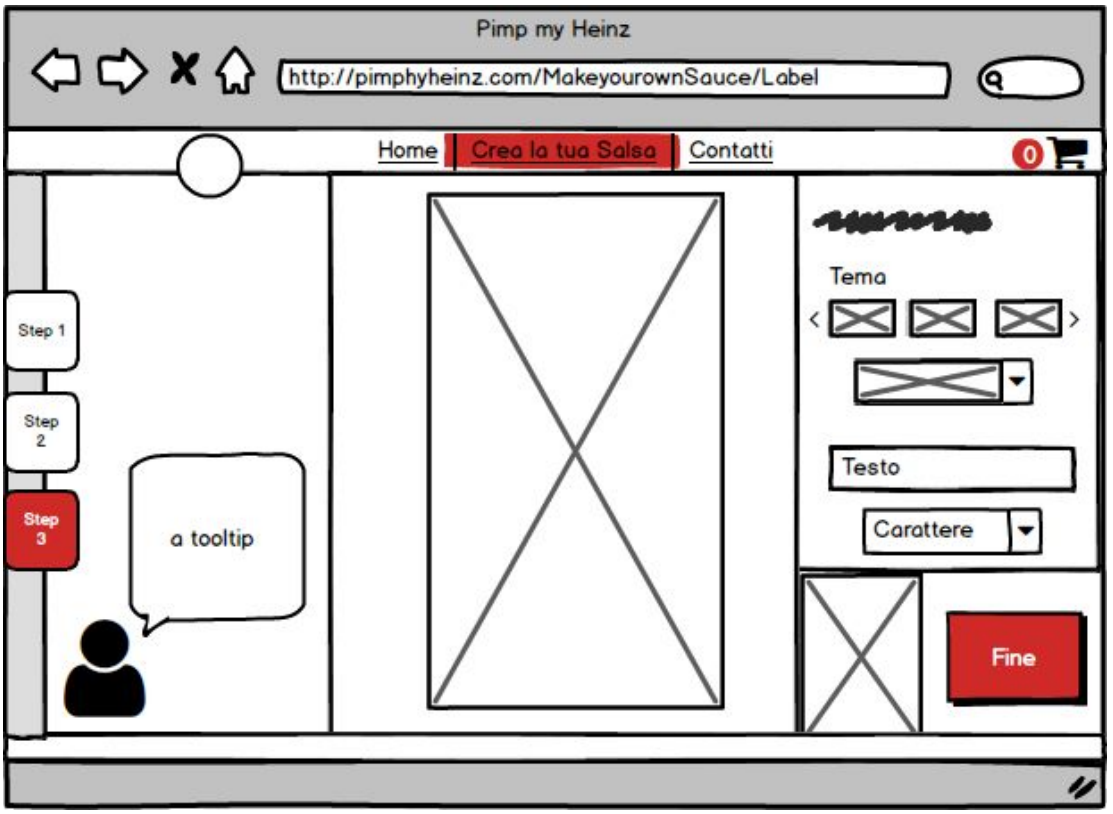

Figure 32. *Crea la tua salsa* → Subsection 5: Label Customization Mockup

Figure 33. *Chart's* Mockup

-

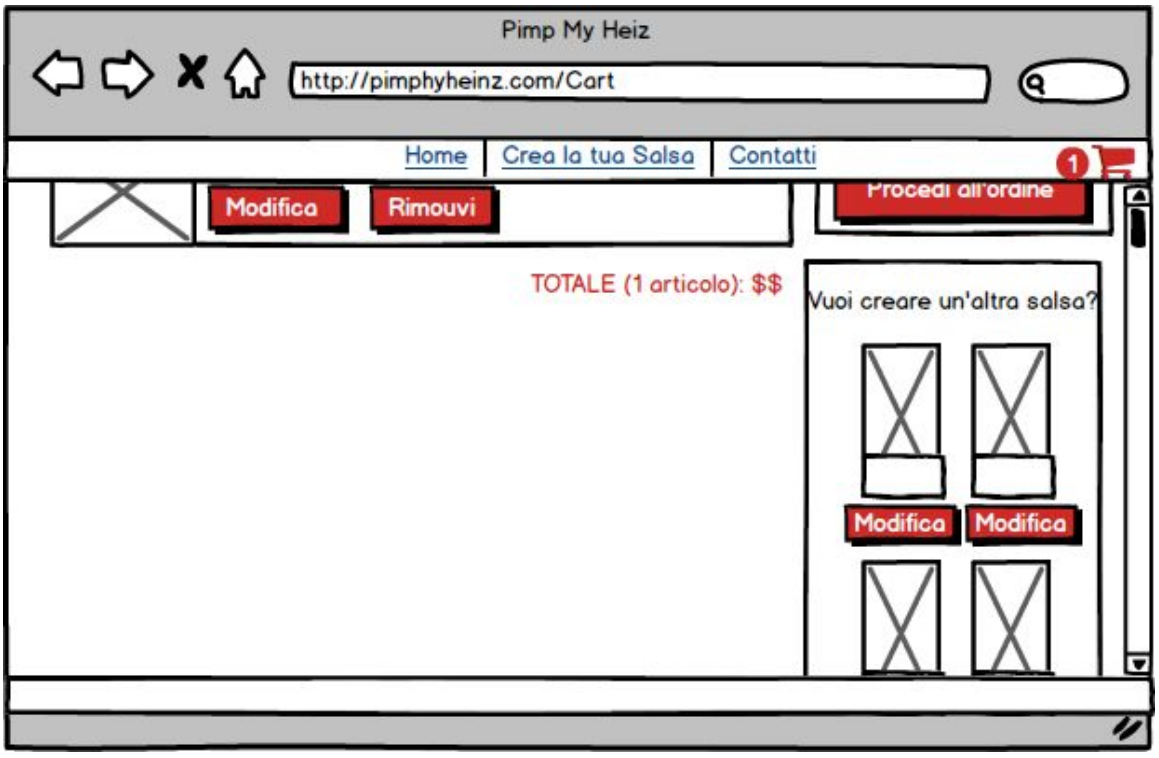

Figure 34. Chart's Mockup → focus on "Vuoi creare un'altra salsa?"

Figure 35. Chart's Mockup → Purchase's conclusion

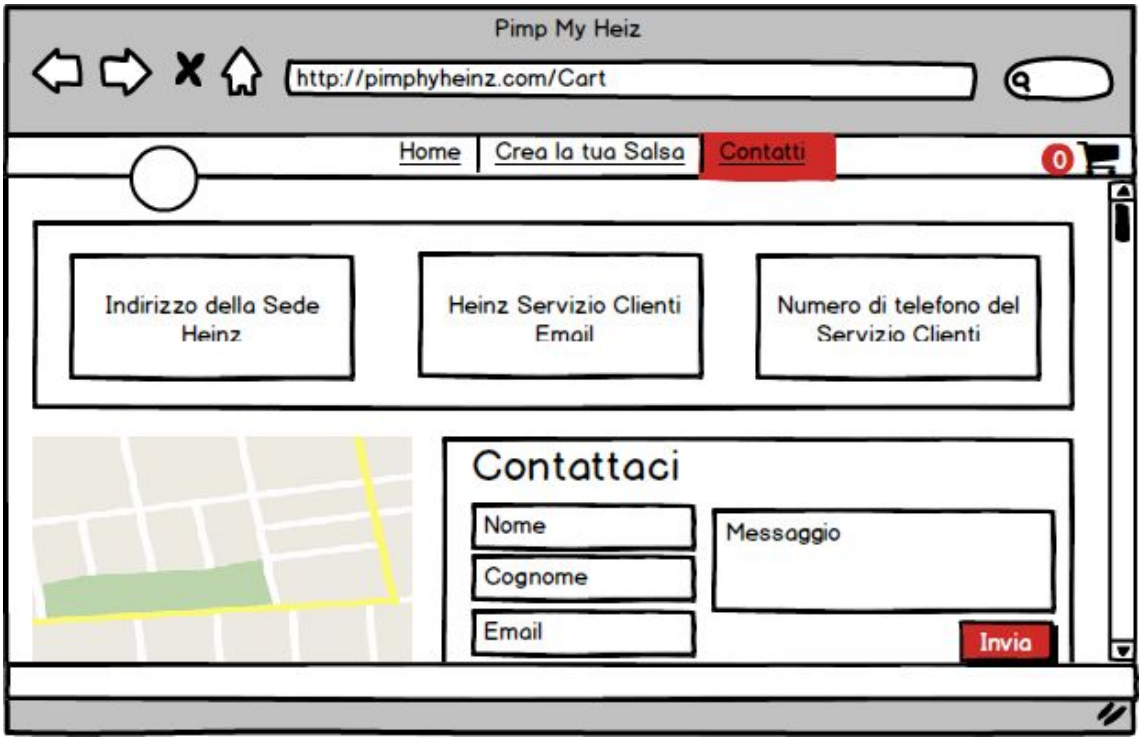

Figure 36. Contact's Mockup

5. Evaluation of the design

"Aoh dai, c'hai mezz'ora! Non stamo a fà Kubrick!"

René [vedendo Duccio che si rilassava su un divano]

Once a coherent prototype has been designed, it is necessary to evaluate its usability. As with the Assessment of existing resources (Section 2), a first evaluation phase has been conducted by the development team; then, at a later time, a second evaluation phase has been conducted by some users with a low-budget user testing to test the system usability.

5.1 Inspection

COGNITIVE WALKTHROUGH - A Cognitive Walkthrough is a formalized way of imaging thoughts and actions of users when they use an interface to perform for the first time a task. Having a series of drawings to try, we have selected a task to perform on the interface and we have created a credible story about each action that the user must execute to complete the task. The credibility of the story determines the plausibility of the usability of the interface for the chosen user segment. The story is credible since we can motivate each action of the user relying on general knowledge of the assumed user and on the indications and feedback provided by the interface.

To build the Cognitive Walkthrough the following elements have been used:

1. A series of drawings of the interface, as detailed as possible (see Final Design Sources folder (Design_Version_6.0));
2. The description of the following task: "Create your own ketchup sauce. Customize the ingredients: choose the "San Marzano" tomato, the white wine vinegar, the Tropea onion and also add the basil. As you want a ketchup with little sodium content, it lowers the salt to a minimum. At this point, choose a glass bottle as the sauce container. Then customize the bottle label by choosing a "Grandma's tablecloth" template and write "Traditional Ketchup". At this point, buy your customized sauce."
3. List of actions necessary to complete the task (*Happy Path*, ideal sequence to perform the task):

    a. In the starting page of the platform, click on the icon related to the base sauce one wants to customize to start the customization process;
    b. In the sauce customization page, click on the tomato icon located in the pipeline section among the required ingredients;
    c. Among the tomato varieties that constitute the fan that opens as the tomato icon gets clicked on, click on the one labeled as "San Marzano";
    d. In the sauce customization page, click on the vinegar icon located in the pipeline section among the required ingredients;

e. Among the vinegar varieties that constitute the fan that opens as the vinegar icon gets clicked on, click on the one labeled as “White Wine Vinegar”;
f. In the sauce customization page, click on the onion icon located in the pipeline section among the required ingredients;
g. Among the onion varieties that constitute the fan that opens as the vinegar icon gets clicked on, click on the one labeled as “Tropea Onion”;
h. In the sauce customization page, click on the diamond-shaped icon, labeled as “Heinz Top Secret” and located in the pipeline section among the required ingredients, to have Tom Atoes signalling the secrecy of these ingredients and reassuring the user about their quality;
i. Once the required ingredients are decided, click on one additional ingredient on the shelf and drag it into one of the additional slots on the pipeline. Repeat until necessary;
j. If it is necessary to nullify an action taken previously, click on one selected additional ingredient and drag it into the Basket standing near Tom in order to return it back;
k. In the left section of the sauce customization page, click on the “Choose the ingredients’ quantity” button;
l. In the modal, click on the water slider bar to regulate the sauce density;
m. In the modal, click on the saltiness-sweetness slider bar to regulate the saltiness-to-sweetness ratio;
n. In the modal, click on the vinegar slider bar to regulate the vinegar quantity;
o. In the modal, click on the onion slider bar to regulate the onion quantity;
p. In the modal, click on the additional ingredient slider bar to regulate the additional ingredient quantity. Repeat as necessary, for each additional ingredient;
q. In the modal, click on the “Save” button to save the changes made;
r. Click on the "Next Section" button and get redirected to the bottle editing page;
s. In the bottle editing page, click on one bottle icon in the right section to select the respective material;
t. In the bottle editing page, click on the marker of the slider bar located below the central bottle to select the desired size;
u. Click on the "Next Section" button to get to the label editing page;
v. In the label editing page, click on one template icon listed in the Template bar on the right section of the page to select the desired label template;
w. Click on one color palette listed in the Palette bar on the right section of the page to select the desired label color;
x. Click on the text bar and enter textual input to add textual content to the label;
y. Click on the character bar to open a drop-down menu and click on the desired font;
z. If it is necessary to go back to the previous page, click on the "Previous Section" button.
aa. If it is necessary to go back to a precise page of the customization process, click on its respective section on the lateral menu.
bb. Once finished, click on the “Ho finito!” button to complete the customization process.

cc. At any stage of the process, if it is desired to skip certain phases and buy directly the product, it is possible to do so by clicking on the “Cart” section of the lateral menu.
dd. Before it is possible to end definitely the customization process, Tom asks the user if they are sure their sauce is complete. Click “Yes” to trigger the loading of the customized sauce; click “No” otherwise.

4. Description of the user and her skills and expectations (see chapter 1, sections 3.3 and 4.2).

The Cognitive Walkthrough is the following:

A girl wants to customize a ketchup sauce because she wants a refined sauce, with high quality ingredients of specific origin. She decides to customize her Heinz ketchup, so she chooses ketchup as the sauce to make from the starting page of the platform for customizing sauces, where there are all the base sauces that can be modified. After being taken to the initial sauce editing page and having a general look of it, she begins tweaking the ingredients, starting with the tomato. She clicks on the tomato icon, which is blinking to make the user understand that the icon at issue is clickable, and gets a fan showing images of different tomato varieties. She hovers the mouse over a specific variety. This specific variety image becomes bigger, a label opens and shows the name of the variety of the chosen tomato. She hovers the mouse over all the varieties to read all their names, then she chooses and clicks on her favorite tomato, the "San Marzano". The fan is automatically closed and at this point she performs the same operation with vinegar and onion, choosing white wine vinegar and Tropea onion. At the end of these selections she clicks on “Heinz top secret” ingredients. At this point, Tom Atoes, the character who talks to the users, informs her that these ingredients are not modifiable, since they consist in the secret Heinz ingredients. Satisfied with the ingredients chosen and with the information given by Tom Atoes about “Heinz top secret” ingredients, she reads another advice by Tom Atoes: to add the user’s favorite ingredients from the pantry, dropping them in the pipe. Initially, she drops the lemon into the pipe, then she changes her mind. Remembering Tom Atoes' suggestion to drop the ingredients that are no longer wanted in the basket next to him, she drops the lemon in the basket. The lemon is automatically placed in the pantry again. Then, she drops the basil and feels satisfied. Then she clicks on the "Next Section" button and is redirected to the bottle editing page. She takes a look at the functionalities of the bottle editing page, then she reads the names of the available materials shown as labels under the bottles - each in a specific material. She chooses the glass bottle and clicks it. A glass bottle appears to her as a central image and, in addition, the chosen box of a single material bottle is highlighted on its perimeter. Satisfied, she clicks on the "Next Section" button and gets to the label editing page. She takes a look at the functionalities of the page, then she chooses a template first. She clicks on different templates until she finds the one she likes best. Then she clicks on a template called "Grandma's Tablecloth". She knows the name because when she hovers the mouse over the preview of the template, the preview of the template becomes bigger and a label with the name of the template is shown. Then she moves on to insert a text in a form where there is an indication as a

placeholder "Insert text ...". The text that she inserts into the form appears simultaneously on the image of the bottle. She is satisfied with every choice made. She goes back through the "Previous Section" button to check every choice made, from the changes made on the bottle until the modifications of the actual ingredients. Returning to the ingredients page, she can see that she can change the quantity of ingredients (she have noticed this functionality also before). She clicks on the box characterized by the icon of the cake. It is enlarges when the mouse hovers and a modal opens when it is clicked. She uses the slider bar to reduce salt to a minimum. She clicks on the "Save" button. Once the modal is closed and after finishing the final check, she clicks on the "Cart (icon)" section of the side menu to switch to payment. Tom asks her if she is sure to have finished the process to customize her sauce. Two buttons are available: "Sì" and "No" button, to answer yes or no. She clicks on "Sì" button. The loading of the customized sauce starts and some tips with some curiosities about ketchup are shown to the user."

SELF EVALUATION - The character chosen as user is very realistic, since an ordinary user would perform a task similar to this described. From the Cognitive Walkthrough, it is understood that the majority of the commands for the required actions are present, and the links between controls, actions and feedback tend to be appropriate. There are still some discrepancies, such as the action of clicking on an ingredient in order to drag and drop it in the pipeline: in this case it might be intuitive to take the ingredients from the shelf and bring them among the other ingredients, but there is no actual indication nor feedback that indicates such information to the user coming from the system (beside Tom): nothing indicates that the user has to drag and drop ingredients. The same is applicable to both the selection of the material and the selection of the template and palette (there is no default option selected).

There errors, since they are not structural nor fundamental, will be considered during user testing and corrected accordingly.

ACTION ANALYSIS - The action analysis is an evaluation process that closely examines the sequence of actions to be performed to complete a task. Since the formal action analysis is very complicated and lengthy to be carried out, we have decided to perform an informal action analysis (also called *back-of-the-envelope analysis*). It is less precise than formal action analysis, but easier to carry out. By means of this type of analysis, we will be able to highlight excessive complications, excessively long execution times and blatant interface issues.

The informal action analysis ignores the micro-detail and focuses on the big picture, listing a "natural" series of actions and evaluating them globally. The goal is an heuristic determination of the steps with greatest weight in terms of time and number of atomic actions in the execution of a task and therefore the potential sources of excessive complexity, loss of time and disorientation.

The following questions will be asked:

1. Can I execute a simple task in a simple manner?

2. Can I perform a frequent task quickly?
3. How many steps and facts do I need to learn before I can perform a task?
4. Did we describe each step in the documentation?

In addition, it is necessary to reflect whether:

- a task does not require comparable times to do it by hand;
- the addition of a feature will or will not complicate the interface;
- adding new ways to accomplish a task;
- check which operations may end generating an error and how serious this error may end up being in terms of time needed to fix it.

The performed actions are:

1. Go to the platform that allows you to customize the sauce.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user can just click on the "Crea la tua salsa" section in the primary navbar.
Can I perform this frequent task quickly?	Yes. The user has just to click on the "Crea la tua salsa" section in the primary navbar.
How many steps and facts do I need to learn before I can perform a task?	No steps.
Did we describe each step in the documentation?	Yes, we do.

Table 9. Questions and answers related to Action 1.

2. Select the *x* mandatory ingredient.

Questions	Answers
Can I execute this simple task in a simple manner?	At first, it was difficult to understand that you have to click on the ingredient in pipe to select your favorite one. So, we added an animation on the ingredient in the pipe at issue to provide visibility.
Can I perform this frequent task quickly?	After adding an animation on the ingredient at issue, it is very easy to perform this frequent task quickly.

How many steps and facts do I need to learn before I can perform a task?	The user has to learn that she has to click on the ingredient in the pipe, select her favorite type (all the types are shown in a fan) clicking on it or dropping it into a fitted circle.
Did we describe each step in the documentation?	Yes, we do.

Table 10. Questions and answers related to Action 2.

3. Select the *y* optional ingredient.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user just has to drop the y ingredient in its fitted place in the pipe.
Can I perform this frequent task quickly?	At first, it is not a quick action, since we wanted to obtain the same difficulty you have in a video game.
How many steps and facts do I need to learn before I can perform a task?	The first step to keep on this action is reading the advice given by Tom Atoes, the character that speaks to the user. After understanding his advice, the user can keep on with the task, dropping her favorite ingredient into its place in the pipe.
Did we describe each step in the documentation?	Yes, we do.

Table 11. Questions and answers related to Action 3.

4. Select the maximum quantity of the *z* ingredient.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user has to click on the box “Scegli la quantità degli ingredienti”. The visibility is very high, since a pie chart signals the box. In addition, the user is helped by the name of the box, which is like an instruction. Once opened the box as a modal, the user will be able to select

	the quantity of a single ingredient on a slider bar, choosing between three default quantities signaled on the bar. After these operations, the user has to save the selection and close the modal. At first, there was a problem with this step: there was no “Save” and “Close” (“X”) buttons, but just a button called “Indietro”. In this case, the user would have not been sure that her changes had been saved.
Can I perform this frequent task quickly?	After learning all the steps, the execution of the task will be quick. Also in this case, we wanted to obtain a certain slowness to obtain a video game effect.
How many steps and facts do I need to learn before I can perform a task?	Three steps: clicking on the box, selecting the quantities on the slider bars and saving the selection.
Did we describe each step in the documentation?	Yes, we do.

Table 12. Questions and answers related to Action 4.

5. Delete the ingredient *a* to replace it.

Questions	Answers
Can I execute this simple task in a simple manner?	At first, it was too difficult to grasp how to replace an ingredient. The user had to put the ingredients back on the shelf in the same place as before, but this was not intuitive enough. After some modifications, now it is easy. The user has just to drop the ingredient at issue in the bin, as explained by Tom Atoes, the characters that gives instructions to the user. She can also put the ingredient on the shelf again, even if this action is less intuitive.
Can I perform this frequent task quickly?	After the modifications, yes. Just a drag and drop to a bin or to a shelf.
How many steps and facts do I need to learn before I can perform a task?	One: a drag and drop to a bin or to a shelf.

Did we describe each step in the documentation?	Yes, we do.

Table 13. Questions and answers related to Action 5.

6. Select the *b* size bottle.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The steps in which the user has to select her favorite bottle material and size are easier than the steps of ingredients selection. The user has just to select her favorite bottle size by means of a slider bar under the bottle itself. The slider bar sets some default values. The user has to choose one of the default values.
Can I perform this frequent task quickly?	Yes, since it implies just one slider bar to set the size.
How many steps and facts do I need to learn before I can perform a task?	One: just the choosing of a default value on the slider bar.
Did we describe each step in the documentation?	Yes, we do.

Table 14. Questions and answers related to Action 6.

7. Select the *c* material for the bottle.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user has just to select her favorite material in a box. No drag and drop, just a click.
Can I perform this frequent task quickly?	Yes, since it implies just one step.
How many steps and facts do I need to learn before I can perform a task?	One: the selection on the user's favorite material in a box by means of a click on the material card.
Did we describe each step in the documentation?	Yes, we do.

Table 15. Questions and answers related to Action 7.

8. Select the *d* template for the label.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The users has just to click on her favorite template in a box. Not all the available templates are available, the user has to use the slider to see them all.
Can I perform this frequent task quickly?	Yes, just one click on the user's favorite template, possibly using the slider to see them all.
How many steps and facts do I need to learn before I can perform a task?	One, if the user's favorite template is in the first templates shown. Two, if the user has to use the slider.
Did we describe each step in the documentation?	Yes, we do.

Table 16. Questions and answers related to Action 8.

9. Write the text *e* on the bottle.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user has just to insert her text in a form. The feedback is provided by the simultaneous appearing of the text on the bottle.
Can I perform this frequent task quickly?	Yes, just writing a text.
How many steps and facts do I need to learn before I can perform a task?	One: writing the text in a form.
Did we describe each step in the documentation?	Yes, we do.

Table 17. Questions and answers related to Action 9.

10. Select the *f* font for the inserted text.

Questions	Answers
Can I execute this simple task in a simple manner?	Yes. The user has to choose her favorite font in a drop-down menu, possibly scrolling it.
Can I perform this frequent task quickly?	Yes, just searching for the user's favorite font scrolling a drop-down menu.
How many steps and facts do I need to learn before I can perform a task?	One: opening a drop-down menu, possibly scrolling it to find the best font.
Did we describe each step in the documentation?	Yes, we do.

Table 18. Questions and answers related to Action 10.

11. Shift from the *g* edit section to *h* edit section.

Questions	Answers
Can I execute this simple task in a simple manner?	At first, we had some problems with it. We had two means to shift from a section to another: a button with the symbol ">>" to go ahead to the next section , and a menu in which each section corresponds to an edit section. The function of the button was not clear, so its name has been replaced with "Sezione successiva". The menu has been made more visible.
Can I perform this frequent task quickly?	After modifying the two means to shift from a section to another, this frequent task can be performed quickly.
How many steps and facts do I need to learn before I can perform a task?	One, whether using the button or the menu.
Did we describe each step in the documentation?	Yes, we do.

Table 19. Questions and answers related to Action 11.

HEURISTIC ANALYSIS - The 10 guidelines by Nielsen & Molich have been adopted to perform the heuristic analysis.

Heuristic	Difficulties	Opportunities
Visibility of system status	The colour of "Sezione Precedente" button must be modified	
Match between system and real world	The replacement basket could be mistaken for a shopping cart	The language used follows real-world conventions
User control and freedom	Undo and redo are not supported to preserve the game-like character of the platform	
Consistency and standards		
Error prevention	The actions are informed by Tom Atos and there is a confirmation option before the finalizing the product	The conceptual models and the design prevent from major error-prone conditions
Recognition and recall	In the label customization fixed labels are needed to show the names of the themes	
Flexibility and efficiency of use		There are ways to speed up processes for expert users that do not result cumbersome for novice users
Aesthetic and minimalist design	Some ingredients might further information to be acted on requiring less user effort	
Help users recognize, diagnose and recover from errors		Tom Atoms covers this functions in order to help users to recognize, diagnose and recover from errors.
Help and documentation	There is not so-to-say documentation...	...though the system offers informative and instructive support thanks to Tom Atos

Table 20. Heuristic analysis.

5.2 Usability Testing

The testing method that has been chosen to evaluate the designed subsite for the customization of Heinz sauces - “Pimp My Heinz” - is *Discount Usability Testing*, an economical evaluation method based on thinking-aloud tests. This technique is part of a design cycle where a prototype is tested and problems are detected and dealt with in an iterative way.

Here the same protocol defined for “Heinz” and “CustomHeats” website was used. The tests carried out on real users have allowed us to make credible, realistic and demonstrable considerations on the system, starting from the problems encountered by them. The diagnosis of such problems has been the basis for improving the usability of the system that is being designed.

“Pimp My Heinz” subsite is a platform that allows users to customize their own Heinz sauces. The process of making a customized sauce is divided in four steps:

1. The user has to select a base sauce.
2. Then, she has to select particular types of ingredients, divided into mandatory and additional ingredients. She can also set their single quantities up.
3. She can choose the material of the bottle of the sauce and its size.
4. Then, she can choose a template, a palette of colors, a text and a font to customize the sauce label.

The only one step that is mandatory is the selection of specific varieties of mandatory ingredients. All the other steps are customary.

The chosen protocol, the *Informal Thinking Aloud*, requires users who are taking the test to think literally aloud during the test, expressing their thoughts, doubts and reflections on the steps to reach their goal. The testers have been selected depending on their characteristics in a way similar to the characteristics of our target user.

Later in the documentation, testers will be referred to by using their alphabetical identifier. It is very important to underline that every user selected to test the website in question does not know the system and has never used or visualized it before.

The testers are the following:

1. Tester A: Since this tester had to perform the Pilot Test, a member of our team has been chosen. In particular, a member that did not follow the designing of the wireframes and of the final design has been selected in order to maximize the probability of running into errors.
2. Tester B: A 24-year-old female Humanities student. She is a very quiet girl, loves to stay at home and enrich her home with cute furniture, floor plans and knick-knacks.

3. Tester C: He is 23 years old and studies at the conservatory. she has been a vegetarian for 5 years, since she loves the environment and is keen not to damage it.

The tests have been performed on some drawings of the interface.

The tasks to be performed by the testers are four. They are useful for obtaining indications regarding the usability of the system being designed. They have been expressed in Italian since all the test participants were Italian. They are the following:

Number	Task	Goal
1	Choose to customize a ketchup sauce by inserting the "San Marzano" tomato, apple vinegar and Tropea onion. Now change the tomato with the "Ciliegino" variety.	Testing the effectiveness, the visibility and the feedback of the functionality that allows the user to customize mandatory ingredients.
2	Starting from the previous task, select three optional ingredients (basil, cloves, lemon) to customize your sauce. Now buy your Heinz sauce.	Testing the effectiveness, the visibility and the feedback of the functionality that allows the user to customize optional ingredients and the buttons to go the cart / the button of the cart to shift to payment.
3	Starting from the previous task, you forgot to change some characteristics of the sauce: make it more salty and thicker.	Testing the effectiveness, the visibility and the feedback of the commands to go ahead and back from a section to another and of the slider bars to modify the quantities of ingredients.
4	Starting from the previous task, customize the label by choosing the template called "cyberpunk" and writing the text "Punk My Heinz". Now choose the 32 oz size glass bottle.	Testing the effectiveness, the visibility and the feedback of the functionalities that allow the user to customize the bottle label, material, text over the label and bottle size. In addition, the commands to go ahead and back from a section to another are tested again.

Table 21. User tasks and associated goals.

Task 1 is necessary to test if the user is able to grasp and understand that the mandatory ingredients have to be modified not starting from "Dispensa" box, and not from the pipe itself. The user can feel confused from having two different functionalities to change the ingredients that work in different manners: the ingredients in the pipe have to be changed clicking on their icon and clicking (or dropping) one of their varieties, while the additional ingredients have to be dropped from the "Dispensa" box to the pipeline.

Task 2 is necessary to test if the user is able to grasp and understand that the additional ingredients have to be modified starting from "Dispensa" box, and not from the pipe itself. The user can feel confused from having two different functionalities to change the ingredients that work in different manners even dealing with this task. In addition, the user can have some difficulties in understanding that the additional ingredients have to be dropped in some special places for them in the pipe.

Task 3 is necessary to test if the user is able to navigate from a section of the website to another one in a fluid manner using the available commands. In addition, the task is used to test if the box to modify the quantities of ingredients is visible enough and if the working of the slider bars to change the quantities is intuitive and effective.

Task 4 in necessary to test if all the functionalities to customize the packaging of the sauce are well understandable by the user.

5.2.2 Testing

For each tester, the evidence / results following the execution of a task, the comments, the suggestions, the reflections and mental processes expressed during the test are reported. This information will be useful for improving the prototype and drawing the final conclusions.

1. Pilot Tester: he has been asked to be the pilot tester of the prototype. He seemed amused and enthusiast about taking the test.

    - Task 1: The user selects Ketchup as the sauce he wants to customize in the sauce selection page "Scegli la salsa". He has troubles with recognizing the tomato icon, so he looks around the interface elements; once he recognized it, he clicks on it. He cannot understand which is the right variety among the varieties in the fan that pops up from the interaction, expecting a label or something similar. Since there is no label, he tries to click on one of the icons that represent the varieties without criteria to see if some information about it would appear. In this way, he becomes able to find the required variety of tomato. He does the same operations on the vinegar icon, in order to select the Apple Vinegar among the varieties, and the same with the onion icon. When he clicks on the spoon icon, representing Heinz secret ingredients, nothing happens and thus he feels lost because it does not behave like the other mandatory ingredients. The main problem, in all this cases, is that he

apparently does not read the textual information provided by Tom. He suggests to further highlight Tom's speech bubble by making the rest of the background opaque. When asked to change the tomato variety to "Ciliegino", he does so without hesitation.

He has successfully completed the assigned task, but with significant difficulties.

- Task 2: He clicks immediately on the plus sign but nothing happens; he does not know what to do. After a while, he clicks on the basil icon, taking for granted that an option for adding it would pop up immediately, but no pop-up. He did not assume the drag and drop functionality immediately, but after a while he tries to do a drag and drop with an ingredient to the "+" symbol, just as a trial. The trial works, so he drags all the required ingredients in their right places in the pipe. When he tries to buy the sauce, at first he clicks on the basket; since nothing happens, he then tries to complete the task by clicking on the Cart in the primary navbar. There is no explicit "Buy" button on each step of the customization, he comments. Then, he clicks on the button "Customizza la Bottiglia" and then "Customizza l'Etichetta", until he reaches the right button that allows him to buy the product, the so-called "Ho finito!" button.

  He has successfully completed the assigned task.

- Task 3: At first, he clicks on the "Salsa" section, but he explains that he is searching for a go back button, expecting it to be near "Customizza". He does not know what to do to make his sauce thicker and more salty and in the meanwhile noticing that he cannot go back to the section dedicated to the choice of the base sauce. After a while, looking around the interface, he clicks on "Scegli la quantità degli ingredienti" box. He realizes that he has to reduce the level of water and to increase the level of saltiness in order to complete the task. He tries to do this on the pie chart, but it does not work, since it is not a dynamic pie chart. So, he uses the slider bars. After the execution of this operation, he recommends to use some kind of visual cue to allow the user to keep track of his position at all times, knowing where he is, which steps he completed and which ones he still needs to complete. He also suggests to delete the "Up arrow" symbol in the Pipeline section because it is misleading.

  He has successfully completed the assigned task.

- Task 4: He clicks on the "Etichetta" section, he clicks on "Palette" and selects the Red one. Then, when he understands that he has to pick up a Template, he struggles with understanding which is the "Cyberpunk" one, because there are no visible label popping up or shown. He also asks the reason why the template is not draggable like the ingredients, expecting the same mechanism. He recommends to use a slider bar to stroll through templates, showing a selected theme on the bottle whenever the user scrolls the templates. He clicks

on the “Bottiglia” section, then he immediately uses the slider bar to modify the dimensions of the bottle. He then clicks on the bottle icons in order to understand which is the respective material. No label is available in a fixed way, so after reading the labels appearing with the mouse hover, he chooses the required material.

He has successfully completed the assigned task.

The Pilot Test has been performed before the definition of the Cognitive Walkthrough, even if we violated the rule that imposes to create a Creative Walkthrough and then to start with the user testing. This because we had some problems with the definition and design of the commands present on the interface, necessary for navigating from a section of the website to another. After the first phase of the design process, we realized that there were very few buttons to navigate the website and their names were in most cases misleading or, where instead of a name we had a symbol, the symbol was not communicative enough. We proceeded with the redefinition of a new draft of the interface, in which useful commands were added to navigate the sections. In examining the new draft, it was noticed that there were too many buttons, many of which would have been useless or even misleading. In this situation, instead of studying for a new design again, we decided to perform a preventive test on a user to realize how effectively a real user would have moved, in particular which and how she would use the commands present on the interface. By means of this first preventive test, we have realized the problems related to the recognition and use of commands, so we brought some changes to them. In particular:

- Two new sections have been added to the side menu: "Choose the sauce", since this page, once entered into the sauce editing platform, was no longer reachable from any point of the website; "Cart (icon)", to allow the user to proceed with the purchase at any time during the customization of the sauce.

- The form of the secret ingredients in the pipe has been changed. Since it previously had the same shape as the clickable ingredients, it seemed clickable, whereas it was not. Changing the form and adding the text "Heinz top secret" solves the problem.

- The buttons to switch between sections have been changed. Initially there was only one button called "Customize + name of the next section". The function of this button was not well understood. In addition, the name was misleading. There was also no button to return to the previous section. These problems have been solved by replacing this button with two new buttons, called a "Previous section" with the symbol "<" and "Next section" with the symbol ">".

- Fixed labels have been added to indicate the material of which a bottle is made in the "Salsa" section in the "Materials" box.

- The lever on the "Etichetta" section has been removed because it is not useful and also due to space issues. Clicking the "Ho finito!" button is enough to start loading the customized sauce.

- Further feedback has been provided in the side menu to let the user understand in which step of the customization process she is, how many steps she has already finished and how many are missing. The feedback consists of green ticks next to each section where all the steps have already been completed.

After the first preventive test, the Cognitive Walkthrough has revealed new problems:

- No feedback was provided regarding the pre-selected default template. A red frame has been added to the default template. Furthermore, the default template appears larger than the other template previews. Each time a template is selected, it will take on these characteristics.

- The same strategy has been used for the default material bottle.

After the first test, the Pilot Test some modifications on the interface have been performed, since there were too many errors in the design of the interface to keep on with the tests. Each modification has been designed and produced starting from the results of the Pilot Test and the difficulties observed during it. The problems observed during the Cognitive Walkthrough have not been corrected immediately, since they were really marginal. It was decided to test the interface on real users first, to verify if these problems were actually real, before correcting them. Furthermore, tests on real users has been also performed with the aim of investigating whether interface design errors were still not detected. Here are the tests:

2. Tester B:

    - Task 1: The user selects Ketchup as the sauce she wants to customize in the sauce selection page “Scegli la salsa”. She has troubles with recognizing the tomato icon at the first sight: she starts to try differents functionalities, since she is not able to grasp which is the functionality that allows her to customize the tomato ingredient. At first, the “Scegli la quantità degli ingredienti” box and reasons aloud asking herself which is the function of this box. She answers herself that this box is not useful to choose a particular type of a tomato, but just its quantity, maybe. Then, she moves to the “Dispensa” box. She is quite convinced that the tomato is there, but she finds no tomatoes, just some other types of ingredients. Only after trying these functionalities, she notices the icon of the tomato in the pipe. She clicks on it and sees a fan with some different varieties of the tomato at issue. She tries to put the cursor on the icon of one variety and then another and another until she finds the right one, reading the label of the variety when she hovers the icon. So, she clicks on the “San Marzano” icon. At this point, it is important to underline that she cannot understand which it is among the varieties that pop up from the interaction in an intuitive way from the beginning, since she expected a fixed label or something similar next to each icon. Then, after learning the system, she clicks on the vinegar icon, in order to select the Apple Vinegar among the varieties, and the same thing occurs. When selecting the onion icon, the same thing

occurs once again. After selecting all the required ingredients, she comes back on the tomato icon in the pipe, clicks on it and changes the variety with the required one.
The main problem the tester at issue has run into is the learning of the system. In particular, she had to literally learn how the customization of ingredients in the pipe worked with a really significant effort.

She has successfully completed the assigned task, but with significant difficulties.

- Task 2: At the beginning of the task, she clicks on a "+" icon in the pipe in a very convinced manner, but nothing happens. She seems frustrated. Since she feels in trouble and does not what to do, she uses as a last hope the advice given by Tom. She reads from him that she has to drag and drop the additional ingredients she would like to have from the dispensa to the pipe. So, she drops the required ingredients on the "+" icons.
  The main problem here is the misleading symbol used to signal the places to drop the additional ingredients in the pipe and the lack of visibility of additional ingredients icons.

  She has successfully completed the assigned task.

- Task 3: The first thing she does is moving quickly in the "Dispensa" box, expecting she would find salt as ingredient, but she finds no salt. The, she asks herself is the arrows in the pipe are useful for doing something. She answers herself that probably they are not useful for finding salt ingredient. At this point, since she cannot find any salt, she shifts to think of something that could make the sauce thicker. She has no idea about that. She keeps on reflecting and says that maybe changing the variety of the tomato the sauce would be thicker, but rapidly changes her mind and clicks on "Sezione successiva" button. She realizes that the next section is dedicated to the customization of the bottle, so she comes back to the previous section. She notices the "Heinz Top Secret" ingredients, so she says that maybe here there are some ingredients that make the sauce thicker. She clicks on it, but she realizes that that icon is not clickable. She keeps on reflecting on the ingredients that probably make the sauce thicker, but finally decides to give the task up.
  The main problem here is that it is not understandable where the salt can be found. At the end of the test, where she comments some aspects of the performed tasks, she says to the team that she had thought also that probably the salt could have been in the "Scegli la quantità degli ingredienti" box, but finally she discarded this possibility thinking that she would have found only the previously selected ingredients here, not also other not previously selected ones.

  She has not successfully completed the assigned task.

- Task 4: She rapidly clicks on the “Bottiglia” section in the side menu. She immediately finds the glass bottle and select the 32 oz value on the slider bar under the image of the bottle. Then she shifts to “Etichetta” section. At first, she clicks on the palette, saying that she would choose a specific color to create a cyberpunk style for the bottle, but suddenly changes her mind. So, she looks at the templates and chooses the right one, hovering the mouse over them and reading the labels that open at the hover of the mouse. Then, she inserts in the right form the required test.
  The only one uncertainty is on the palette, considering it necessary to set a theme for the bottle. In addition, she commented that she could not understand that the combination on color shown in a drop-down menu in the “Etichetta” section does not seem a palette, but just some colors to select individually. She suggested to add a margin to the preview of the palette in the drop-down menu to make the users understand that it is a palette, not something else.

  She has successfully completed the assigned task.

3. Tester C:

- Task 1: The user selects Ketchup as the sauce she wants to customize in the sauce selection page “Scegli la salsa”. He has troubles with recognizing the tomato icon at the first sight: at first, he looks for the tomato into the “Dispensa” box, but finds no tomato. After a moment, he notices the icon of a tomato in a pipe and clicks on it. He obtains a fan of varieties. He says that he presumes that each icon in the fan represents a different type of tomato. He starts to hover them and to read the appearing labels with the names of the varieties. He clicks on the right icon of the variety after reading the label “San Marzano” down below the icon. He performs the same actions even for the vinegar and onion. After these actions, he clicks again on the tomato icon in the pipe and selects the requested variety.
  The main problem is with “Dispensa” box. When requiring to select an ingredient, he immediately goes to the “Dispensa” box.

  He has successfully completed the assigned task.

- Task 2: He clicks immediately on “+” symbol in the pipe, believing that it would open up a fan of varieties, as it happens with tomatoes, vinegar and onion icons. But nothing happens. So he grasps that it is necessary to dropping the ingredients from “Dispensa” box to the pipe in a moment. He drags the ingredients, realizing with the exception that he had to do drag and drop. “If you cannot add them by clicking on the plus, then you will have to drag them from the pantry.” he says. After that, he clicks on the “Cart (icon)” to shift to the payment.

The main problem here is the misleading symbol used to signal the places to drop the additional ingredients in the pipe and the lack of visibility of additional ingredients icons.

He has successfully completed the assigned task.

- Task 3: The first thing he does is clicking on the “Scegli la quantità degli ingredienti” box. A modal opens. When he sees all the slider bars to modify the quantities of the ingredients he feels a little bit scared due to the quantities of slider bars. But this lasts just a moment. He immediately minimize the quantity of water at its lowest level and maximize the quantity of salt using the slider bars.

  He has successfully completed the assigned task.

- Task 4: He clicks immediately on the “Etichetta” section of the side menu. He immediately scrolls the bar of templates, searching for the word “cyberpunk”. He finds no “cyberpunk” word, so he choose the right theme based on the colors of the preview of the theme. Then, he clicks on the “Bottiglia” section of the side menu. So, he uses the slider to set the right size of the bottle up. Then, he selects the required material, clicking on the right “Materiali” card. At the end of the task, he asks which is the function of the commands next to the preview bottle. The team members explain that they are useful to observe the bottle from every side, but due to the software used to draw the interface screens, it was impossible to use better arrows for 3D vision of the bottle.

  He has successfully completed the assigned task.

The conclusions drawn from the testers’ experiences are the following:

- Since the user could not immediately understand the names of the product varieties in the fan, for each mandatory ingredient, a single variety of ingredient in the fan has been selected by default. The icon of this variety has been made larger than the others and a fixed label has been added to it to indicate the name of this variety. This improves its visibility and also improves the usability of the entire tool.

- The "Dispensa" section has been closed and now appears like some closed drawers. It will remain closed during all the steps in which it is necessary to choose a mandatory ingredient. This because the user was always looking for the mandatory ingredients in the pantry first.

- The drawers of the “Dispensa” section open only once all the mandatory ingredients have been chosen. Once they are opened, the ingredients will appear as a medal, just like the ingredients in the pipe. In this way the user, who previously had problems in understanding that there was a need for drag and

drop actions, will understand that these ingredients have to be placed in the pipe, for homogeneity. To further improve the visibility of drag and drop actions and to replace the "+" symbol in the pipe, a great source of confusion, this symbol has been replaced by the target form of drag and drop.

- Since users had difficulty in understanding which ingredients could be modified in terms of quantity in the appropriate section and where some ingredients not present either in the “Dispensa” section nor in the pipe were, those same ingredients has been added to the pipe, where they can be modified also in terms of variety. They themselves have become mandatory ingredients. These are: salt, sugar, water and oil. Finally, only the quantities of the ingredients selected by the user can be modified in the appropriate section.

- The elements in the “Dispensa” section will appear larger with an enlarged label, when you hover or select them. Even when not selected and even without hover, the labels will remain fixed. This because users had problems in recognizing the required ingredients.

- All the ingredients present in the modal, where you can modify their quantities, are not divided into mandatory and additional anymore. This because the division at issue makes no sense.

- All the templates shown in the “Etichetta” section are given with fixed labels containing the names of each template itself. This because users had problems in recognizing the required theme without fixed labels.

- When Tom Atoes suggests to use the Basket to put away the ingredients that you don't want to use anymore, all the screen goes dark, apart from the box in which Tom is present, the cloud with the advice and the Basket.

5.2.3 Analysis of subjective and objective data

Following the tests on “Pimp My Heinz” website, it has been possible to gather all the useful data from them and draw some interesting conclusions. In this analysis, only the tester B and C’s tests are taken into account, since after the Pilot Test, the first test performed, some modifications have been produced, and the same also after the Cognitive Walkthrough.

- Task 1: None of the two users immediately understands that to change tomato (and so to change an obligatory ingredient) it is necessary to click on its icon in the pipe, and then to choose one of the varieties presented in the fan. This because the visibility of the ingredients in the “Dispensa” section is much greater than the visibility of the icons in the pipe, although they blink, each during its own level. To solve the problem, the “Dispensa” section was closed (only during the modification of the mandatory ingredients, after it opens) and labels were added under each ingredient icon in the pipe. This task enlights another problem: the user cannot understand immediately which are the varieties included in the fan. To solve this problem, only one variety

appears as selected, so it is larger and has a red frame, and a label with its name is associated to it.

- Task 2: Both the users have found the same problems. The "+" symbol in the pipe are misleading, since the user expects that she can add an ingredient clicking on them. The other problem is that the user does not understand she has to drag the additional ingredients in the pipe. To solve these problems, the "+" symbol has been replaced with a symbol that represents the target of the drag and drop.

- Task 3: There are some doubts in the users in performing this task. They understand which is the function of the box, so they understand that it is used to change the quantities of ingredients, but they do not find it easy to use. One user in particular erroneously believes that it is possible to change the quantity only of the selected ingredients. To make the tool smarter, the division between mandatory and optional ingredients in the modal has been eliminated and it has been decided that only the ingredients actually selected will be included in the modal.

- Task 4: The users performs the task quite quickly. The only problems that are highlighted is the lack of a label to signal the names of the templates. New labels to signal the names of the templates have been added to solve this problem.

6. Conclusions and Recommendations

> *"Dobbiamo fare cinquanta minuti in due giorni, cosa che a me sembra una follia, ma tant'è che li dobbiamo fare. Questa è la puntata di chiusura quindi non ci sono più storie sospese, ok? Nessuno è più basito, chiaro? Nessuno è più basito, nessuno è sorpreso, ognuno di voi ha capito tutto. Nei primi piani fate sì con la testa, che avete capito e state sereni."*
>
> Arianna [agli attori]

"Pimp my Heinz" was conceived to offer to its users the chance of being involved in every stage of the production process in order to custom design their own product line of Heinz sauces. Facing up the challenges that follow extreme customization, the pivoting following the various research and design steps have revolved around the focal point of usability and user experience. The result achieved is a complete and well documented process ending in a satisfactory final design that constitutes a solid base for an implementation. Both the inspection and the user testing did not brought out irremediable nor glaring issues, even though they came out to be extremely useful in improving the design proposal iteratively - the errors have been amended in the wireframes.

The ancillary site further developments could be functionally enriched with a system login linked and could have user profiles and host a users' community. This would allow functions such as saving a sauce under construction in order to give the opportunity to interrupt the customization and get back to it later on recovering what was already done. For what concerns the design of the interfaces for the customizations of the other sauces (Mayo, Mustard and BBQ) processing pipe will be adapted to the requirements in the making of the specific sauce - e.g. for the mayo it will be devoted more focus to instruct the user to customize the sauce paying attention to the order of the ingredients selection and timing. As expected the additional ingredients will change resulting from careful research. Eventually, the colours and themes of commands will adapt to the sauce style.

To ensure responsiveness some sketches of the mobile web version have been inserted in the documentation. Besides this it could be interesting to design a mobile application as it could open more perspective for enriching the gamification to boost up some aspects of the customization process.